April 2001

hp learning products

issued october 2000 : http://www.hp.com/support/tape may have a later version

dlt vs80 tape drive user's guide

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contact hp

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obtaining technical support

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before calling for service or support

If you need help, your dealer has the latest information regarding HP products and services and can provide support under HP's comprehensive menu of reseller services. If your dealer is not able to help, you can obtain support from HP directly either through online services or by telephone.

Before calling for service or support, check that:

- Check that your HP Surestore Tape Drive is installed correctly
- Check the printed Getting Started Guide and the troubleshooting advice in this online User's Guide

obtaining service

Please use the Customer Service Form to collect the details that our Customer Service Representative will need to help solve your problem.

During the warranty period: HP provides a free telephone support service during the warranty period. Contact your local HP dealer or the appropriate HP technical support contact for your area, by selecting the region required from the navigational buttons in the left hand pane. Obtain the telephone number from the list of countries supplied. You will be connected to a responsive team waiting to help you.

After the warranty period: If you require support after your warranty has expired, you can receive support for a fee through the same telephone numbers. The fee is charged on a per incident basis. Alternatively, you can contact your local HP dealer who will be able to advise you and arrange for service.

contacting hp

A full listing of HP's service and support centres worldwide can be found at http://www.hp.com/cposupport/mail_support.html

If you do not have internet access, click on the appropriate region from the side navigation bars for a list of contact numbers correct at time of printing.

hp service agreements

HP offers a number of service agreements to meet your needs. Contact your local dealer or nearest HP office for further information.

returning your tape drive for service

Your HP Surestore tape drive comes with a 24-hour Express Exchange warranty (not available in all countries).

Before returning an HP Surestore tape drive, call the Customer Support Center for your area. When you call, make sure that you have the following information available:

- The product name and serial number (see label on the back of the appliance server)
- Date of purchase
- A description of the product fault
- A contact name for details of the failure
- A contact telephone number
- Your shipping address

The telephone service agent will verify that the unit is faulty and will make sure that a replacement unit is sent to you within 24 hours. When you receive the replacement unit, remove it from the packaging and use the packaging material for returning the faulty unit. All shipment costs are prepaid by HP.

When returning the drive to HP, any damage caused as a result of inadequate packaging is your responsibility. Use the original packing materials whenever possible.

worldwide online services

HP offers electronic services that give you a fast, interactive way to access information and help on setup, configuration, installation and operation of your product. The online services are available on the World Wide Web and FTP, as well as the country-specific resources listed later in this section.

World Wide Web

Product and support information are available from HP's web site on the Internet at `http://www.hp.com/go/tape`

FTP

Product and support information are available from our FTP site on the Internet at `ftp.hp.com/pub/information_storage/surestore`

America Online

Download support documents and discuss issues in user forums. Find us with keyword `hpstor`.

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check the web for up to date information

If you have internet access, click on the URL below:

http://www.hp.com/cposupport/mail_support.html

From time to time, telephone numbers and addresses may change; accessing contact details over the web will ensure you have the latest information.

If you do not have internet access, refer below for a list of contact numbers correct at time of printing:

hp support in north america

Customers in North America can contact HP on the telephone support lines listed, by country, below.

Major Account Customers in the Enterprise Market
Tape drives shipped to major North American account customers carry one of the following product numbers (as stated on the label on the base of your drive):

products for major account customers	
tape drive	**product number**
ultrium 230, internal	C7400A
ultrium 230, external	C7401A
ultrium 230, rack mounted	C7470A

If your drive carries one of these product numbers, you should contact the US Response Center on:

800-633-3600

canada

Telephone	905-206-4663	905-206-4663
	Hours of operation: 8.00 a.m. to 8.00 p.m. Monday through Friday	Horaires de disponibilité : Lundi - Vendredi, 8 h 00 - 20 h 00

united states

Telephone	(970) 635-1500
	Hours of operation: 6.00 a.m. to 6.00 p.m. MST Monday through Friday

hp support in south america

Customers in South America can contact HP on the telephone support lines listed, by country, below.

Major Account Customers
Where a second number is listed under the sub-heading "Major Account Customers", this number should be used by major account customers where the product number (as stated on the label on the base of your drive) is as follows:

products for major account customers	
tape drive	**product number**
ultrium 230, internal	C7400A
ultrium 230, external	C7401A
ultrium 230, rack mounted	C7470A

argentina

Telephone	0810 555 5520 (from within Argentina) (5411) 4778 8380 (outside Argentina)	0810 555 5520 (5411) 4778 8380
	Hours of operation: 8:30 a.m. to 7:30 p.m. Monday through Friday	Horas de atención: Lunes a Viernes de 8:30 a 19:30 h
		+54 1781 4061
	Major Account Customers	
Telephone	+54 1781 4061	

brazil

Telephone	Great São Paulo: (11) 3747-7799	Grande São Paulo: (11) 3747-7799
	Other regions: 0800 157751	Demais regiões: 0800 157751
	Hours of operation: 8:00 a.m. to 7:00 p.m. Monday through Friday	horário de funcionamento: Pré-vendas Televendas : 2a a 6a feira das 08 às 22h Sábado das 09 às 18h
		Pós-vendas: 2a a 6a feira das 08 às 19h
	Major Account Customers	
Telephone	+55 11 725 1588	+55 11 725 1588

chile

Telephone	800 22 5547	800 22 5547
	Hours of operation: 9:00 a.m. to 6:00 p.m. Monday through Friday	Horas de atención: Lunes a Viernes de 9:00 a 18:00 h

colombia

Telephone	9 800 91477	9 800 91477
	Hours of operation: 9:00 a.m. to 6:00 p.m. Monday through Friday	Horas de atención: Lunes a Viernes de 9:00 a 18:00 h

guatemala

Telephone	800 999 5305	800 999 5305
	Hours of operation: 9:00 a.m. to 6:00 p.m. Monday through Friday	Horas de atención: Lunes a Viernes de 9:00 a 18:00 h
	Saturdays from 9:00 a.m. to 1.00 p.m.	

mexico

Mexico City		
Telephone	52-58-9922	52-58-9922
	Hours of operation: 8:30 a.m. to 22:00 p.m. Monday through Friday	Horas de atención: Lunes a Viernes de 8:30 a 22:00 h
	9:00 a.m. to 14:00 p.m. on Saturday	
Outside Mexico City		
Telephone	01-800-472 6684	01-800-472 6684
	Hours of operation: 8:30 a.m. to 22:00 p.m. Monday through Friday	Horas de atención: Lunes a Viernes de 8:30 a 22:00 h
	9:00 a.m. to 14:00 p.m. on Saturday	
		+52 5258 4500
	Major Account Customers	
Telephone	+52 5258 4500	

puerto rico

Telephone	1 877 2320 589	1 877 2320 589
	Hours of operation: 9:00 a.m. to 5:00 p.m. Monday through Friday	Horas de atención: Lunes a Viernes de 9:00 a 17:00 h

venezuela

Telephone	800 47 777 (Caracas 207 8488)	800 47 777 (Caracas 207 8488)
	Hours of operation: 8:00 a.m. to 5:00 p.m. Monday through Friday	Horas de atención: Lunes a Viernes de 8:00 a 19.00 h
		+58 2 239 2423
	Major Account Customers	
Telephone	+58 2 239 2423	

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check the web for up to date information

If you have internet access, click on the URL below:

http://www.hp.com/cposupport/mail_support.html

From time to time, telephone numbers and addresses may change; accessing contact details over the web will ensure you have the latest information.

If you do not have internet access, refer below for a list of contact numbers correct at time of printing:

hp support in europe, middle east & africa

There is no charge for technical support during the warranty period (unless otherwise stated). A per-incident charge applies after the warranty period.

Customers in Europe, the Middle East and Africa can contact HP on the telephone support lines listed, by country, below.

Major Account Customers
Where a second number is listed under the sub-heading "Major Account Customers", this number should be used by major account customers where the product number (as stated on the label on the base of your drive) is as follows:

products for major account customers	
tape drive	**product number**
ultrium 230, internal	C7400A
ultrium 230, external	C7401A
ultrium 230, rack mounted	C7470A

or major account customers in Africa and the Middle East can call +41 22 780 41 11

austria

Telephone +43 (0)810 00 6080

Hours of operation: 8:30 to 18:00 Monday through Friday

+43 (0)810 00 6080

Geschäftszeiten: Montag - Freitag, 08.30 - 18.00 Uhr

Major Account Customers
Telephone +43 (0)222 25000/250 or +43 (0)125 0000

+43 (0)222 25000/250 or +43 (0)125 0000

belgium (dutch)

Telephone +32 (0)2 626 88 06

Hours of operation: 8:00 to 18:00 Monday through Thursday

belgium (french)

Telephone +32 (0)2 626 88 07

Hours of operation: 8:30 to 18:00 Monday through Friday

+32 (0)2 626 88 07

Horaires de disponibilité: Lundi - Vendredi , 8 h 30 - 18 h 00

Major Account Customers
Telephone +32 (0)2 778 38 00

+32 (0)2 778 38 00

czech republic

Telephone +42 (0)2 6130 7310

Hours of operation: 8:00 to 18:00
Monday to Thursday,

8.00 to 16:30
Friday

Major Account Customers
Telephone +42 (0)2 61 307 751 or
+42 (0)2 47 17 321

denmark

Telephone +45 39 29 4099

Hours of operation: 8:30 to 18:00
Monday through Friday

Major Account Customers
Telephone +45 99 19 19
or +45 4599 10 00

finland

Telephone +358 (0)203 47 288

Hours of operation: 8:30 to 18:00
Monday through Friday

Major Account Customers
Telephone +358 9 8872 2808 or
+358 0887 21

france

Telephone +33 (0)1 43 62 34 34 | +33 (0)1 43 62 34 34

Hours of operation: 8:30 to 18:00
Monday through Friday | Horaires de disponibilité: Lundi - Vendredi , 8 h 30 - 18 h 00

Major Account Customers | +33 (0)5 49 76 66 07 or +33 1698 2 6060
Telephone +33 (0)5 49 76 66 07 or
+33 1698 2 6060

germany

Telephone +49 (0)180 52 58 143 | +49 (0)180 52 58 143

Hours of operation: 8:30 to 18:00
Monday through Friday | Geschäftszeiten: Montag - Freitag, 08.30 - 18.00 Uhr

Major Account Customers | +49 (0)180 53 53 539 or +49 2102 441 133
Telephone +49 (0)180 53 53 539 or
+49 2102 441 133

greece

Telephone +30 (0)1 619 64 11

Hours of operation: 9:00 to 17:00
Monday through Friday

Major Account Customers

Telephone +30 (0)1 68 96 503/4 or +30 1689 6411

hungary

Telephone +36 (0)1 382 1111

Hours of operation: 8:30 to 18:00
Monday through Friday

Major Account Customers

Telephone +36 (0)1 461 81 11 or +36 (0)1 252 4505

ireland

Telephone +353 (0)1 662 5525

Hours of operation: 8:30 to 18:00
Monday through Friday

Major Account Customers

Telephone +353 (0)1 284 4560

israel

Telephone +972 (0)9 952 4848

Hours of operation: 9:00 to 18:00
Sunday through Thursday

Major Account Customers

Telephone +972 (0)9 952 4848

italy

Telephone +39 (0)2 264 10350

+39 02 264 10350

Hours of operation: 8:30 to 18:00
Monday through Friday

Orario d'apertura: Lunedì-Venerdì, 8:30 - 18:00

Major Account Customers
Telephone +39 (0)2 9212 2779 or +39 (0)2 9212 2778

+39 (0)2 9212 2779 or +39 (0)2 9212 2778

netherlands

Telephone +31 (0)20 606 8751

Hours of operation: 8:30 to 18:00 Monday through Friday

Major Account Customers
Telephone +31 (0)20 547 7444 or +31 (0)20 547 9666

norway

Telephone +47 22 11 6299

Hours of operation: 8:30 to 18:00 Monday through Friday

Major Account Customers
Telephone +47 22 73 5601 or +47 22 735 600

poland

Telephone +48 22 519 06 00

Hours of operation: 8:00 to 17:00 Monday through Friday

Major Account Customers
Telephone +48 22 608 74 00 or +48 22 375 065

portugal

Telephone +351 21 317 6333

+351 21 317 6333

Hours of operation: 8:30 to 18:00 Monday through Friday

Horário de operação: Segunda - Sexta, 8:30 - 17:00

Major Account Customers
Telephone +351 482 8555 or +351 1301 7344

+39 (0)2 9212 2779 or +351 1301 7344

russian federation (moscow)

Telephone +7 095 797 3520

Hours of operation: 9:00 to 18:00 Monday through Friday

Major Account Customers
Telephone +7 095 797 3500 or
+7 095 938 6885

russian federation (st petersburg)

Telephone +7 812 346 7997

Hours of operation: 9:00
to 18:00
Monday through Friday

Major Account Customers
Telephone +7 812 259 3557 or
+7 095 938 6885

russian federation (ukraine)

Telephone +7 (380-44) 490-3520

Hours of operation: 9:00
to 18:00
Monday through Friday

south africa (inside RSA)

Telephone 086 000 1030

Hours of operation: 8:00
to 17:00
Monday through Friday

south africa (outside RSA)

Telephone +27-11 258 9301

Hours of operation: 8:00
to 17:00
Monday through Friday

Major Account Customers
Telephone +27 11 806 1010

spain

Telephone +34 902 321 123

Hours of operation: 8:30
to 18:00
Monday through Friday

+34 902 321 123

Horas de atención: Lunes
a Viernes de 8:30 a
18:00 h

Major Account Customers
Telephone +34 902 22 00 30 or +34
1631 1600

+34 902 22 00 30 or +34
1631 1600

sweden

Telephone +46 (0) 8 619 2170

Hours of operation: 8:30 to 18:00
Monday through Friday

Major Account Customers
Telephone +46 (0)8 444 23 83 or +46 8750 2300

switzerland

Telephone +41 (0) 848 80 11 11

Hours of operation: 8:30 to 18:00
Monday through Friday

Major Account Customers
Telephone +41 (0)800 55 53 53 or +41 31 980 3111

turkey

Telephone +90 (0)212 221 69 69

Hours of operation: 8:30 to 18:00
Monday through Friday

Major Account Customers
Telephone +90 (0)212 224 59 25 or +90 (0)312 468 8770

united arab emirates

Telephone 971 4 883 8454

Hours of operation: 8:30 to 18:00
Monday through Friday

For customers in: UAE, Bahrain, Qatar, Saudi Arabia, Jordan, Palestine, Egypt, Yemen, Lebanon, Kuwait and Oman (languages supported - English and Arabic)

Major Account Customers
Telephone +44 (0)1344 366 366

united kingdom

Telephone +44 (0)207 512 52 02

Hours of operation: 8:30
to 18:00
Monday through Friday

Major Account Customers

Telephone +44 (0)1344 366 366 or
+44 (0)1344 360 000

other european countries (english)

Telephone +44 (0)207 512 52 02

Hours of operation: 8:30
to 18:00
Monday through Friday

Major Account Customers

Telephone +41 22 780 81 11

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asia pacific

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  - japan
  - korea, republic of
  - malaysia
  - new zealand
  - philippines
  - singapore
  - taiwan
  - thailand
  - vietnam

check the web for up to date information

If you have internet access, click on the URL below:

http://www.hp.com/cposupport/mail_support.html

From time to time, telephone numbers and addresses may change; accessing contact details over the web will ensure you have the latest information.

If you do not have internet access, refer below for a list of contact numbers correct at time of printing:

hp support in asia pacific

Customers in Asia Pacific region can contact HP on the telephone support lines listed, by country, below.

Major Account Customers
Where a second number is listed under the sub-heading "Major Account Customers", this number should be used by major account customers where the product number (as stated on the label on the base of your drive) is as follows:

products for major account customers	
tape drive	**product number**
ultrium 230, internal	C7400A
ultrium 230, external	C7401A
ultrium 230, rack mounted	C7470A

or call 852 599 700

australia

Telephone (03) 8877 8000

Hours of operation: 9.00 a.m. to 5:00 p.m. Monday through Friday

Spare parts 1800 670 054

Hours of operation: 9:00 a.m. to 5:00 p.m. Monday through Friday

Major Account Customers

Telephone 61 3272 2895

china (PRC)

Telephone +86 (0)10 6564 5959 +86 (0)10 6564 5959

Hours of operation: 8:30 to 17:30 Monday through Friday

+86 1505 3888

Major Account Customers

Telephone +86 1505 3888

hong kong

Telephone 800 96 7729 800 96 7729

Hours of operation: 8:30 to 17:30 Monday through Friday

852 599 7777

Major Account Customers

Telephone 852 599 7777

india

Telephone +91 11 682 6035

Hours of operation: 9:30 a.m to 5:30 p.m
Monday through Friday

indonesia

Telephone +62 (21) 350 3408

Hours of operation: 8:00 a.m to 5:00 p.m.
Monday through Friday

japan

Telephone +81 3 3335 8333 +81 3 3335 8333

Hours of operation: 9:00 to 12:00 and 13.00 to 17:00
Monday through Friday

+81 42 534 1831

Major Account Customers
Telephone +81 42 534 1831

korea, rupublic of

within Seoul only +82 (2) 3270 0700
Telephone +82 (2) 3270 0700

Hours of operation: 9:00 a.m. to 6:00 p.m.
Monday through Friday.

9:00 a.m. to 1:00 p.m on Saturdays

080 999 0700

outside Seoul only
Telephone 080 999 0700
Hours of operation: 9:00 a.m. to 6:00 p.m.
Monday through Friday.

9:00 a.m. to 1:00 p.m on Saturdays

+81 42 534 1831

Major Account Customers
Telephone +81 42 534 1831

malaysia

Telephone +60 (3) 295 2566

Hours of operation: 8:30
a.m. to 5:30 p.m.
Monday through Friday

Major Account Customers
Telephone +60 (3) 298 6555

new zealand

Telephone +64 (9) 356 6640

Hours of operation: 9:00
a.m. to 5:30 p.m.
Monday through Friday

philippines

Telephone +63 (2) 867 3351

Hours of operation: 8:30
a.m. to 5:30 p.m.
Monday through Friday

singapore

Telephone +65 272 5300

Hours of operation: 8:30
a.m. to 5:30 p.m
Monday through Friday

Major Account Customers
Telephone +65 293 2911

taiwan

Telephone +886 (2) 2717 0055 +886 (2) 2717 0055

Hours of operation: 8:30
a.m. to 5:30 p.m.
Monday through Friday

+886 (2) 712 0404

Major Account Customers
Telephone +886 (2) 712 0404

thailand

Telephone +66 (2) 661 4000

Hours of operation: 8:30
a.m. to 5:30 p.m.
Monday through Friday

vietnam

Telephone +84 (0) 8823 4530

Hours of operation: 8:00 a.m. to 5:00 p.m. Monday through Friday

8.00 a.m to 12:00 p.m on Saturday

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warranty

contents of this section

- warranty conditions
  - exclusions
  - limitations
- limited warranty statement for USA, Canada, Australia and New Zealand

warranty conditions

This warranty gives you specific legal rights. You may also have other rights which vary according to where you are located.

Hewlett-Packard warrants its Surestore tape drives against defects in materials and workmanship for a period of three years, either from the date of delivery or, where the purchase price includes installation by Hewlett-Packard, from the date of installation. If a new HP Surestore tape drive is purchased as a component of an HP computer system, the tape drive warranty is automatically upgraded to the system warranty.

You are entitled to:

- automatic three-year, next day unit exchange
- system matching warranty on HP systems (internal and external units), when purchased as a component of that system
- free technical call center assistance during the product support life (does not include telephone call cost)

Further information is available via the web at: www.hp.com/support/tapewarranty

During the first three years, the 24-hour Express Exchange program (not available in all countries) allows you to receive a replacement unit by next-day delivery upon verification of a faulty tape drive. Hewlett-Packard will, at its option, either repair or replace products that prove to be defective. Should Hewlett-Packard be unable to repair or replace the product within a reasonable period of time, a refund of the purchase price may be given upon return of the product.

If you choose not to use Express Exchange, your HP Surestore tape drive must be serviced by one of the authorized repair depots within the country in which it was originally purchased. You must prepay shipping charges (together with all duty and taxes) for products returned for service. Except for products returned to you from another country, Hewlett-Packard will pay for return of products to you. If the drive is repaired by an authorized dealer, you will need to negotiate the method and cost of returning the drive with the dealer.

exclusions

The warranty on your HP SureStore tape drive does not apply to defects resulting from:

- improper or inadequate maintenance by the customer
- Customer-supplied software or interfaces
- Unauthorized modification or misuse
- Use of unsupported media
- Operation outside the environmental specifications for the product
- Improper site preparation and maintenance

limitations

Any implied warranty of merchantability or fitness is limited to the three-year duration of this written warranty. Some states or provinces do not allow limitations on how long an implied warranty lasts, so limitations or exclusions may not apply to you.

limited warranty statement for USA, Canada, Australia and New Zealand

HP warrants to you, the end-user customer, that HP hardware, accessories and supplies will be free from defects in materials and workmanship after the date of purchase, for the period specified above. If HP receives notice of such defects during the warranty period, HP will, at its option, either repair or replace products which prove to be defective. Replacement products may be either new or like-new.

1. HP warrants to you that HP software will not fail to execute its programming instructions after the date of purchase, for the period specified above, due to defects in material and workmanship when properly installed and used. If HP receives notice of such defects during the warranty period, HP will replace software media which does not execute its programming instructions due to such defects.
2. HP does not warrant that the operation of HP products will be uninterrupted or error free. If HP is unable, within a reasonable time, to repair or replace any product to a condition as warranted, you will be entitled to a refund of the purchase price upon prompt return of the product.
3. HP products may contain remanufactured parts equivalent to new in performance or may have been subject to incidental use.
4. Warranty does not apply to defects resulting from (a) improper or inadequate maintenance or calibration, (b) software, interfacing, parts or supplies not supplied by HP, (c) unauthorized modification or misuse, (d) operation outside of the published environmental specifications for the product, or (e) improper site preparation or maintenance.
5. HP MAKES NO OTHER EXPRESS WARRANTY OR CONDITION WHETHER WRITTEN OR ORAL. TO THE EXTENT ALLOWED BY LOCAL LAW, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, SATISFACTORY QUALITY, OR FITNESS FOR A PARTICULAR PURPOSE IS LIMITED TO THE DURATION OF THE EXPRESS WARRANTY SET FORTH ABOVE. Some countries, states or provinces do not allow limitations on the duration of an implied warranty, so the above limitation or exclusion might not apply to you. This warranty gives you specific legal rights and you might also have other rights that vary from country to country, state to state, or province to province.
6. TO THE EXTENT ALLOWED BY LOCAL LAW, THE REMEDIES IN THIS WARRANTY STATEMENT ARE YOUR SOLE AND EXCLUSIVE REMEDIES. EXCEPT AS INDICATED ABOVE, IN NO EVENT WILL HP OR ITS SUPPLIERS BE LIABLE FOR LOSS OF DATA OR FOR DIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFIT OR DATA), OR OTHER DAMAGE, WHETHER BASED IN CONTRACT, TORT, OR OTHERWISE. Some countries, states or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

FOR CONSUMER TRANSACTIONS IN AUSTRALIA AND NEW ZEALAND: THE WARRANTY TERMS CONTAINED IN THIS STATEMENT, EXCEPT TO THE EXTENT LAWFULLY PERMITTED, DO NOT EXCLUDE, RESTRICT OR MODIFY AND ARE IN ADDITION TO THE MANDATORY STATUTORY RIGHTS APPLICABLE TO THE SALE OF THIS PRODUCT TO YOU.

Consumer Warranty Sept 16/97

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customer service form

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- contact information
- tape drive information
- computer system information
- SCSI bus configuration
- backup information
- information about the problem

Please complete the following information about your system and the problem you are having before you call the HP Customer Support Center. You can print this form and fill in the necessary information before you call, or you can print and fax the completed form to the Customer Service Center.

contact information

Company or Organization:

Contact Person/Title:
(e.g., Mr. John Smith,
Network Administrator)

Contact Telephone Number:

Fax Number:

E-Mail Address:

Mailing Address:

tape drive information

Model Name:
(example:
HP Surestore Ultrium 230i)

Model Number:
(example: HP C1555B)

Serial Number:

Firmware Revision:

Date Purchased:

Date of Last Cleaning:

How many times has cleaning tape been used?

computer system information

Computer Make and Model:
(example:
HP NetServer E-series)

Processor and Clock Speed:
(example: Pentium 550)

Amount of RAM:
(example: 64 MB)

Number of SCSI Controllers:

Computer Operating System/Release
(example:
Novell NetWare 4.0, Windows NT 3.51, HP-UX 10.0)

Operating System Patches Installed:
(example: Service Pack 4)

Number of Hard Disks/Size/Partitions:
(example:
Disk 1: 1.2 GB, 1 partition
Disk 2: 1.8 GB, 2 partitions)

Logical or Physical Mapping of Disks:
(example:
Disk 1 = C:/, Disk 2 = S:/)

SCSI bus configuration

Host Adapter Make and Model
(example:
Adaptec AHA-2940)

SCSI bus
(narrow or wide)

SCSI ID	Device	Termination	Internal / External	Devices' Bus Type
..	.....	.....	.....	.....
..	.....	.....	.....	.....
..	.....	.....	.....	.....

..	.....	.....	.....	.....
..	.....	.....	.....	.....
..	.....	.....	.....	.....
..	.....	.....	.....	.....
7	SCSI Controller	.....	.....	.....

EXAMPLE

SCSI ID	Device	Termination	Internal / External	Devices' Bus Type
0	Hard disk	No	Internal	Narrow / Single-ended
1	CD-ROM	No	Internal	Narrow / Single-ended
3	Tape Drive (HP C1533A)	No	Internal	Narrow / Single-ended
5	Tape Drive (DLT7000)	Yes	External	Wide / Single-ended
7	SCSI Controller	Automatic	HBA	Wide / Single-ended

backup information

Backup Application Name and Version or Release:

Are you using HP One Button Disaster Recovery?

Do you back up user data only?

Do you back up system information separately?
(example:
Windows registry files,
NetWare NDS or bindery files)

information about the problem

Light Pattern During Problem:

Any Audible Signals:

Error Messages/Code Generated:

Does the problem occur every time you try the operation?

Does the problem occur if you use another backup device?

What type of media are you using?
(Brand, Capacity, Batch No.)

Can you read the problem tape cartridge on another drive?

What result do you get when you try a new cartridge?

If you have an autoloader, are all cartridges affected the same way?

Have you run any kind of diagnostics program, such as TapeAssure?
What result was reported?

Detailed Description of Problem:

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http://www.hp.com/support/tape may have a later version

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operate

cartridges

troubleshoot

This is the User's Guide for HP Surestore DLT VS80 internal, external, and removable (rack-mounted) tape drives. It describes how to use HP Surestore DLT VS80 drives.

To start, click on one of the above topics or select a topic from the navigation pane on the left. For example, click on **specifications** for a detailed description of the HP Surestore DLT VS80 internal, external, and removable drives.

Use the **index of topics** page to search for a particular topic.

Use the **contact hp** page to find out contact details for your nearest Customer Care Center.

notice

The information contained in this document is subject to change without notice.

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revision history

Edition	Date	Comments
1.0	April 2001	Initial release

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before you start

contents of this section

- pre-installation check list
- installation
- how to identify your model
- computer and backup software requirements
  - computer systems
  - backup software

pre-installation check list

Before you install your HP Surestore DLT VS80 tape drive:

1. Check that your computer meets the requirements for installation.
2. Make a note of the model name, product number, and serial number of your tape drive.
3. Collect information about the SCSI configuration of your computer and any other devices attached to it and decide how you are going to configure the drive on the SCSI bus. If you are installing on a Windows NT 4, Windows 2000, or Novell NetWare system, you can use the HP Library & TapeTools software. If you are not familiar with how to configure a SCSI bus, you may also want to read the SCSI Background information provided in this guide.
4. Select a free bay for an internal or a removable drive
   or
   Select a site for an external drive.

installation

The *Getting Started* guide provides detailed installation instructions.

Click below for a PDF version of the appropriate guide:

- HP Surestore DLT VS80 internal drives: Getting Started guide
- HP Surestore DLT VS80 external drives: Getting Started guide

  You need a copy of Adobe Acrobat Reader to read the PDF files. If you do not have a copy of this software, you can link to Adobe's web site to download a free copy.

.

how to identify your model

For internal drives, the model name is on the front panel and the product and serial numbers are on a label on the top of the drive.

For external drives, the model name is on the front panel and the product and serial numbers are on a label on the bottom of the drive.

For removable drives, the model name is on the front panel and the product and serial numbers are on a label on the side of the drive.

computer and backup software

The HP Surestore DLT VS80 tape drive has the following hardware and software requirements:

computer systems

If you are installing the tape drive on a UNIX system, refer to the UNIX instructions for further information about the systems supported and installation instructions.

For the latest list of operating systems that support HP Surestore DLT VS80 drives, please consult our World Wide Web site (www.hp.com/go/connect).

HP Surestore DLT VS80 tape drives are Ultra SCSI-2 wide devices designed to operate on a low voltage differential SCSI bus (LVDS) with a burst transfer rate of 40 MB/sec. Using the drive on a single-ended (SE) SCSI bus restricts performance. Do not use on the same bus as other single-ended devices as this will switch the LVDS host adapter into single-ended mode and restrict performance. We recommend that a dedicated host bus adapter is used for the tape drive. A suitable adapter is available from HP as an accessory (see Ordering Information).

Your computer must have a properly installed and configured SCSI host adapter or a SCSI controller on the motherboard (SCSI-2 or SCSI-3 compliant) with driver software that supports the HP Surestore DLT VS80 drive. Check the server documentation for the specification of any built-in SCSI channels. Do not connect to a RAID controller channel; these are for disk drives only. Consult your supplier for details.

For an internal drive, you will need:

- A wide, Ultra SCSI-2 LVDS or SE SCSI bus
- LVDS-compliant SCSI ribbon cable with termination (normally supplied with the host bus adapter)
- Available 5¼-inch, half-height mounting bay
- Mounting hardware, if required
- Backup software that supports the tape drive

For external drives, the cable provided with HP Surestore DLT VS80 tape drives will attach to a computer with a wide LVDS SCSI connector (68 pins). Connecting the drive to an SE SCSI connector or a narrow SCSI host bus adapter will restrict performance. HP recommends that a dedicated host bus adapter is used for the tape drive. If your server or host bus adapter is equipped with a very high density (VHD) wide SCSI connector, you will need to order a High-End Tape Connect Kit (adapter with VHD-to-HD cable) or 68-pin VHD-to-HD cable. (See Ordering Information.)

For removable drives installed in an HP Surestore Tape Array 5300 rack enclosure, set the SCSI ID at the appropriate switch on the rear of the tape array. Each drive should have a unique ID. The HP Surestore Tape Array 5300 has four SCSI ID switches to enable the installation of up to four half-height drives.

backup software

You need backup software that supports the HP Surestore DLT VS80 drive. A TapeWare CD-ROM containing backup software by Yosemite Technologies is supplied with your tape drive.

As a general rule, native backup applications (such as NTBackup and tar) do not provide the required data streaming rate to get the full performance of your HP Surestore DLT VS80 drive. We recommend using a backup application which provides better memory management as well as other useful features, such as TapeAlert. HP, Computer Associates, Veritas, Legato and Yosemite all provide suitable products that have been tested with HP Surestore DLT VS80 drives. For the latest list of backup packages that support HP Surestore DLT VS80 drives, please consult our World Wide Web site (www.hp.com/go/connect).

Details of how to best optimize your tape drive to achieve the maximum performance with your chosen backup application can be obtained from our World Wide Web Site (www.hp.com/support/dlttvs80).

Suitable backup applications will include driver software that establishes the interface between the tape drive and the software. Applications usually recognize tape drives by their manufacturers' ID string rather than their model number, so check the table below for the appropriate reference.

Drive Model	ID String
HP Surestore DLT VS80 tape drive	BNCHMARKDLT1

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hp learning products

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- if you have problems during self test
- resetting the drive

related topics

- interpreting the front panel lights
- cartridges
  - labeling and write-protecting
  - loading and unloading
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switching on the drive

Internal drives are powered on when you switch on your computer.

Switch on **external drives** using the power switch on the rear of the drive, and then switch on the computer.

Removable drives are powered on when you switch on your tape array and computer.

if you have problems during self test

If all the LED lights on the front panel are flashing at the end of the self-test, this indicates a fault has occurred:

- If you have just installed the drive, check the installation for loose connections and repeat the self-test.
- Try the troubleshooting procedures to determine what the problem is.
- If the fault condition persists, call for assistance.

resetting the drive

The drive can be reset without powering off the drive and computer, for example, if the drive stops responding. To reset the drive, press and hold the eject button until all three LEDs come on (which takes about 6 seconds), then release the button.

If the eject button is held down until the LEDS come on (6 seconds) and is continued to be held down, until the lights go off (another 4 seconds), no reset is performed.

If you press and hold the eject button again until the first two LEDs flash, the drive goes into a state ready for the firmware upgrade tape. The drive will return to its normal state after 30-45 seconds of inactivity.

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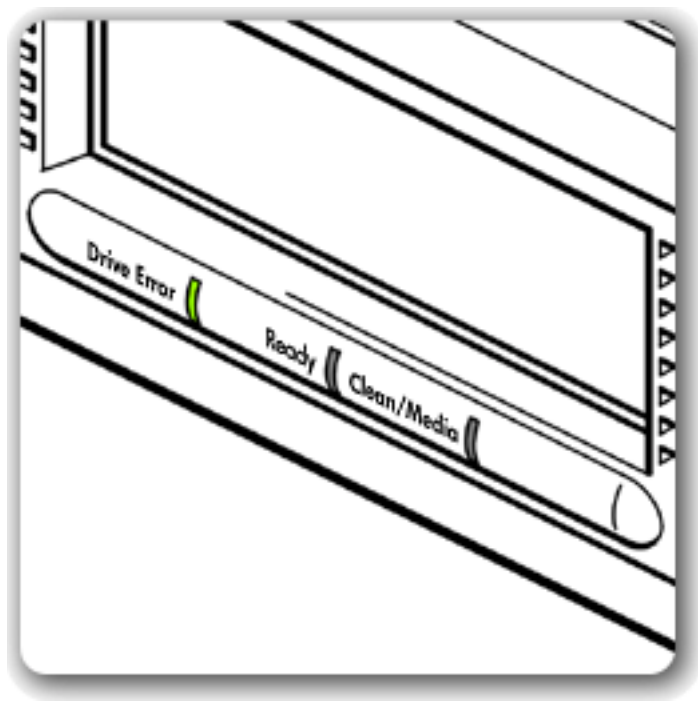
the front panel lights

contents of this section

- front panel lights

front panel lights

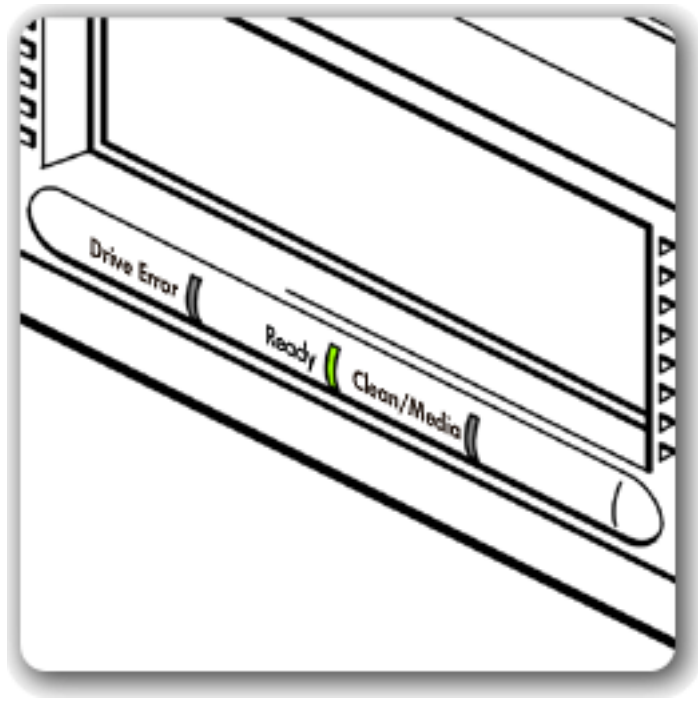
The front panel of your HP Surestore DLT VS80 tape drive has three lights (LEDs) as shown below.



Drive Error (first light)

This LED indicates if an error has been detected.

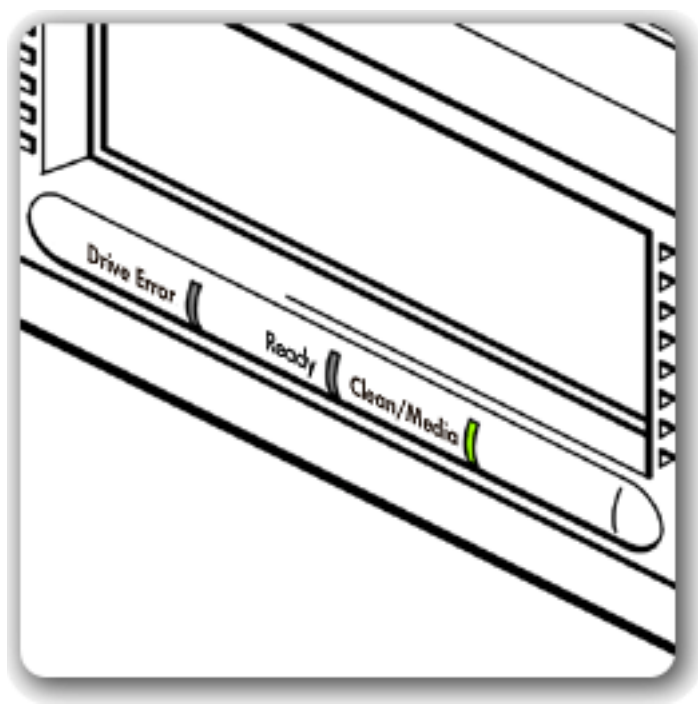
Off:	No fault has been detected.
Flashing:	An unrecoverable or hard error has occurred. Contact Technical Support



Ready (second light)

This LED indicates when a cartridge is loaded and when it is in OBDR mode.

On, steady:	The power to the drive is on.
On, regular flashing:	The tape is in motion.
On, irregular flashing:	The drive is in OBDR mode.
Off:	There is no power to the drive.



Clean/Media (third light)

This LED indicates when a cleaning tape should be used or if the media needs replacing. See also "Cleaning".

On, steady:	Cleaning cartridge in use.
On, flashing:	The media needs replacing or the heads need cleaning. Try cleaning the drive with a DLT VS cleaning tape. If after cleaning, this indicator is illuminated again when you load a DLTtape cartridge: it is probable that the DLTtape cartridge is causing problems. Try a new DLTtape cartridge. If this condition persists with other cartridges, use HP Library and Tape Tools to help you diagnose the problem.
Off:	Cleaning is complete or not needed.

All three LEDS

This indicates the status of the Power On Self Test (POST).

On, steady:	POST is starting.
On, flashing:	A POST error has occurred. For more information, see Troubleshooting.

Note: LEDs during firmware update operation. See also Firmware Updates.

- During the firmware update process DO NOT RESET OR POWER CYCLE THE DRIVE.
- When the drive is in firmware update mode, the Drive Error and Ready LEDS flash.
- If a corrupt or incompatible image is downloaded for a firmware update, the Ready and Write Protected LEDs do not flash. The drive resets and leaves the code update cartridge loaded to indicate that the code update was not successful.
- If a valid image is downloaded the Ready and Drive Error LEDs will flash alternately during the update process. The code update cartridge is ejected on successful completion.

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loading and unloading

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- to load a cartridge
- to unload a cartridge
- to label a cartridge
- to write protect a cartridge

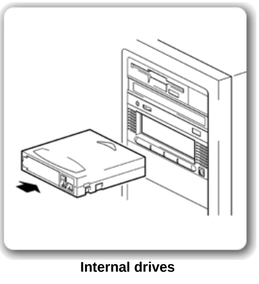
related topics

- cartridge care

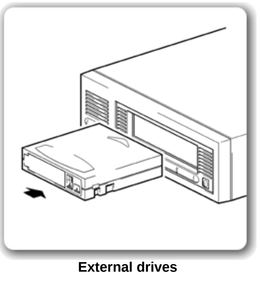
to load a cartridge

Use *only* DLTtape IV cartridges with your drive.

IMPORTANT: If the cartridge has previously been used with an earlier generation DLT tape drive, this may restrict full read/write capability. Refer to the media compatibility page for full details.



Internal drives



External drives

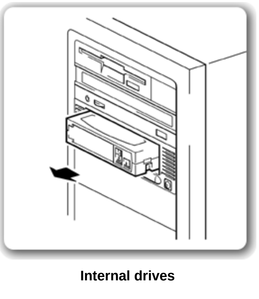
1. Insert the cartridge into the slot in front of the drive, oriented as shown above.
2. Apply gentle pressure on the rear of the cartridge until the drive takes the cartridge and loads it.

The Ready light flashes while the drive performs its load sequence. When the cartridge is loaded, the Ready light is steady.

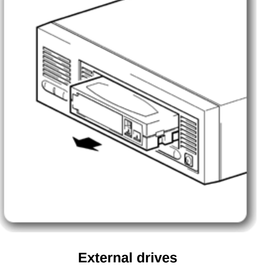
Do not try to force the cartridge if it does not load properly. The drive will eject the cartridge after about 10 seconds so you can load it again.

Note: When you insert a new, unformatted cartridge into your HP Surestore DLT VS80 tape drive, the loading sequence takes longer because the drive is writing reference tracks on the tape.

to unload a cartridge



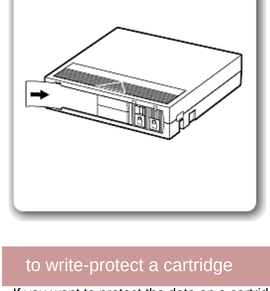
Internal drives



External drives

1. Press the Eject button on the front panel or use your backup software. During the unload sequence the Ready light flashes. The drive completes any task it is currently performing, winds the tape to the beginning, and ejects the cartridge. The eject cycle will take up to two minutes.
2. Remove the cartridge and store it in its plastic case in a cool, dry atmosphere.

to label a cartridge



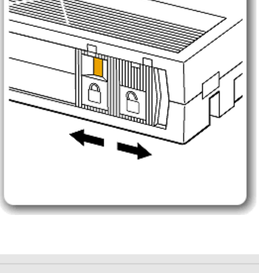
Use *only* DLTtape IV cartridges with your drive. Ensure that only one label is located in the label area of the cartridge. Never use non-standard labels, and never stick anything to the cartridge.

The label area and write-protect switch are on the front of the cartridge, as illustrated.

to write-protect a cartridge

If you want to protect the data on a cartridge from being altered or overwritten, you can write-protect the cartridge. Do this before you insert the cartridge by sliding the write-protect switch on the front of the cartridge.

Caution: Write-protection will not prevent a cartridge being erased by bulk-erasure or degaussing.



To write-protect a cartridge, slide the write-protect switch **to the left**.

Note a small orange rectangle is visible indicating that the cartridge is protected.

To write-enable a cartridge, slide the the write-protect switch **to the right**.

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April 2001

hp learning products

http://www.hp.com/support/tape may have a later version

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replacing a removable drive

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- overview
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overview

HP Surestore DLT VS80 removable drives can be removed and replaced without powering down the tape array and without interrupting operations to the other drives in the array, providing they are not on the same SCSI bus.

If all drives in the tape array are powered up when the system is turned on, the host will be aware of those drives. You can remove any of those drives and replace it with another drive.

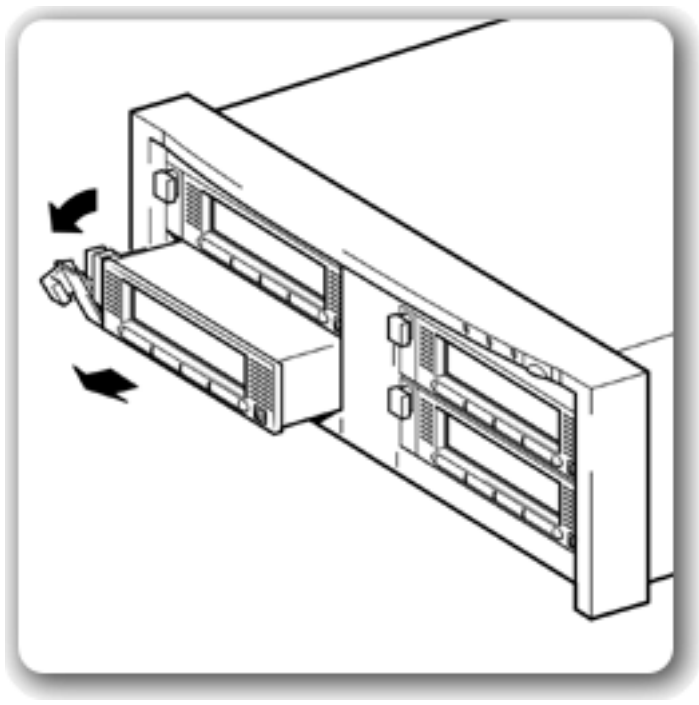
If a drive is not powered up or you place a drive in an empty slot after the system has been powered up, the system will have to be reset before the host will recognize the drive.

Removable drives allow modules to be replaced while powered up as long as no data is being transmitted from the system to the module or to any other module daisy-chained on the same SCSI bus (off-line hot-swap). The SCSI IDs are controlled by the tape array, not by the drives themselves, so if you remove a drive and replace it with another the ID will not change.

If your system is running HPUX, you should be aware of the following when removing a drive:

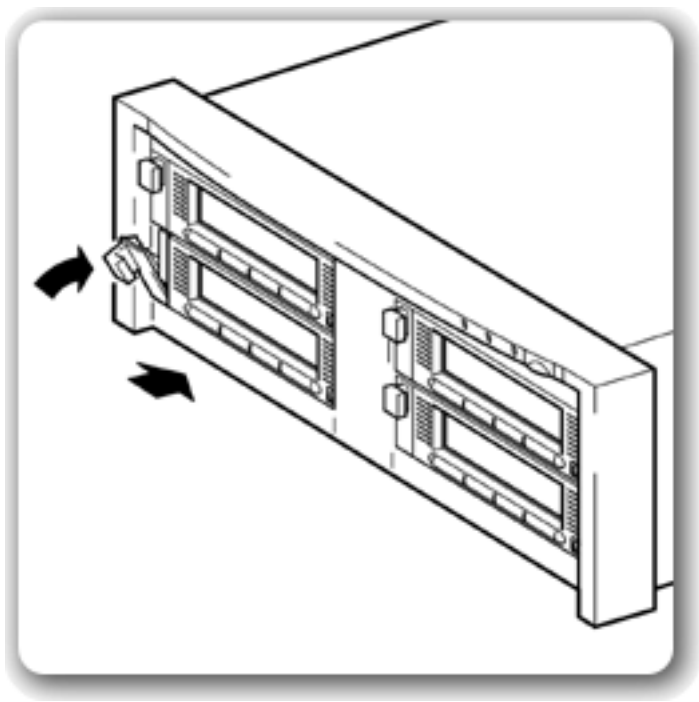
- In Berkeley mode, the tape position will remain unchanged by a device close operation
- In AT&T mode, a device close operation will cause the tape to be repositioned just after the next tape filemark (the start of the next file).

removing a drive



1. Pull the extraction lever of the drive that you want to replace so that it is in the out position.
2. Using the extraction lever, pull the drive carefully and firmly out of the tape array.

replacing a drive



1. Ensure that the extractor lever on the drive is in the out position, as shown in the picture.
2. Lift the drive carefully.
3. Align the rear of the drive with the guides on the side of the HP Surestore Tape Array 5300.
4. Slide the drive along the guides until the connectors on the back mate with the connectors at the back of the enclosure.
5. Push the extractor lever in until it locks the drive in position.

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cartridge care

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- choosing cartridges
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- storing cartridges
- maximizing tape life
- avoiding condensation

related topics

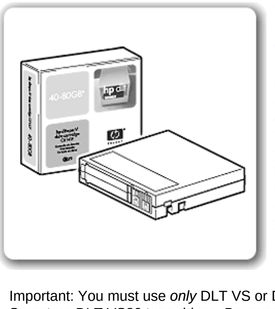
- write-protecting cartridges
- labeling cartridges
- loading and unloading cartridges
- ordering cartridges
- media compatibility
- cleaning

choosing cartridges

Only rely on the best media to protect your valuable data. Thanks to HP's rigorous testing programs, HP Surestore DLT VS80 data and DLT VS cleaning cartridges are the safest investment you can make.

Your HP Surestore DLT VS80 tape drive uses *only* DLTtape IV data cartridges. HP DLTtape IV cartridges are designed to meet the exacting mechanical, environmental and durability specifications of data storage applications.

Order online at: www.hp.com/go/storagemedia.



Your DLT VS80 tape drive can read but not write DLTtape cartridges that use the DLT4000 format. See the media compatibility page for full details.

Make sure all cartridges that you want to use for writing are either unformatted or have been formatted with your DLT VS80 tape drive before loading them. If you want to reuse cartridges that have been formatted by a drive other than DLT VS80, use a magnetic bulk eraser to prepare the cartridges for use with your DLT VS80 tape drive.

Important: You must use *only* DLT VS or DLT1 cleaning cartridges with HP Surestore DLT VS80 tape drives. Be aware that cleaning cartridges that do not specify DLT VS or DLT1 on the cartridge may be accepted by the drive but will not clean the drive. See the media compatibility page for full details.

caring for cartridges

Under optimum environmental conditions, Hewlett-Packard DLTtape IV cartridges are currently specified to 1,000,000 passes over any part of the tape. In operational terms, this can be translated to about 2000 full backup or restore operations. Under severe environmental conditions, particularly where the tape drive is used at very low humidity or if certain areas of the tape are accessed frequently, the number of backup operations should be substantially less than this maximum.

Caution: Ensure that only one label is located in the label area of the cartridge. Never use non-standard labels and never stick anything to the cartridge.

using cartridges

Only use DLTtape IV cartridges in temperatures in the tape drive's operating range from 10C to 40C (50°F to 104°F) and 20 to 80% relative humidity (noncondensing). If you expose cartridges to temperatures outside the operating limits, stabilize them before you use them. To do this, leave the cartridges in the operating environment for 24 hours.

storing cartridges

- Store cartridges at temperatures between 16°C and 32°C (60°F and 90°F) with a relative humidity between 20% and 80%.
- Always keep the cartridges in a dust-free environment.
- Always store cartridges in their plastic cases when not in use.

maximizing tape life

- Do not touch the tape surface.
- Do not attempt to clean the tape path or tape guides inside the cartridge.
- Do not leave cartridge tapes in excessively dry or humid conditions.
- Do not leave cartridges in direct sunlight or near sources of heat or in places where magnetic fields are present (for example, under telephones, next to monitors or near transformers).
- Do not drop cartridges or handle them roughly.
- Do not locate more than one label onto cartridges; extra labels can cause the cartridges to jam in the tape drive.
- Place identification labels only in the slide-in slot on the front of the cartridge.
- Never use any type of adhesive labels on your DLTtape cartridge.

avoiding condensation

Condensation can be a problem for tape drives and cartridges. To minimize the chance of condensation, stay within the specifications for using and storing cartridges above and observe the following guidelines:

1. Position the drive where the temperature is relatively stable -- away from open windows, heat sources and doors.
2. Avoid leaving cartridges in severe temperature conditions, for example, in a car standing in bright sunlight.
3. Avoid transferring data (reading from and writing to cartridges) when the temperature is changing by more than 10°C (18°F) per hour.
4. If you bring a cold tape drive or tape cartridge into a warm room, allow time for it to warm to room temperature before using it. For example, if you have moved the drive from a cold car to a warm room, allow time for the drive to reach room temperature (up to 24 hours if the temperature change is extreme).

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cleaning

contents of this section

- cleaning strategy
- cleaning cartridge
- cleaning the tape heads on a drive

cleaning strategy

HP Surestore DLT VS80 drives have been developed to have a minimal cleaning requirement. The **CLEAN/MEDIA** LED on the tape drive front panel will flash when the drive needs cleaning. Under typical conditions, the drive should seldom require cleaning. However, high duty cycles and adverse environmental conditions may require the drive to be cleaned on a regular basis to ensure optimum performance is maintained, and it is therefore considered good practice to clean the drive approximately every two weeks.

IMPORTANT: It is essential to use only DLT VS or DLT1 cleaning cartridges with HP Surestore DLT VS80 tape drives. Cleaning cartridges from other media manufacturers will not be accepted by the drive (see the media compatibility page for full details). Use of HP cleaning media will ensure your tape drive is fully protected.

cleaning cartridge

You must use *only* DLT VS or DLT1 cleaning cartridges to clean the tape heads (see Ordering Information). A cleaning cartridge is supplied with each tape drive.

Do **not** use swabs or other means of cleaning the heads. The cleaning cartridge uses a special tape to clean the tape heads.

A cleaning cartridge can be used up to 20 times. The cleaning cartridge includes a label with 20 small boxes printed on it. Always place a check mark in a box each time you use the cartridge to clean the drive. Replace the cleaning cartridge when all the boxes are checked.

cleaning the tape heads on a drive

The drive's TapeAlert feature sends a message to your backup application when the tape heads need cleaning and the Clean/Media LED flashes. To clean the tape heads:

1. Insert a DLT VS or DLT1 cleaning cartridge into the drive. The tape drive automatically loads the cartridge and cleans the heads.

   Note: If you insert another type of cleaning cartridge, the Clean/Media LED turns off and no cleaning will be performed. Ensure that cleaning is performed only with DLT VS or DLT1 cleaning cartridges.

   During the cleaning cycle the Clean/Media LED flashes. At the end of the cleaning cycle, the Clean/Media LED turns off to indicate that you should remove the cleaning cartridge. The cleaning cycle can take several minutes.

2. Remove the cleaning cartridge from the drive.

   If the Clean/Media LED starts to flash when you insert a DLTtape cartridge immediately after cleaning, try a new DLTtape cartridge. If this condition persists with other cartridges, use HP Library and Tape Tools to help you diagnose the problem.

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features and specifications

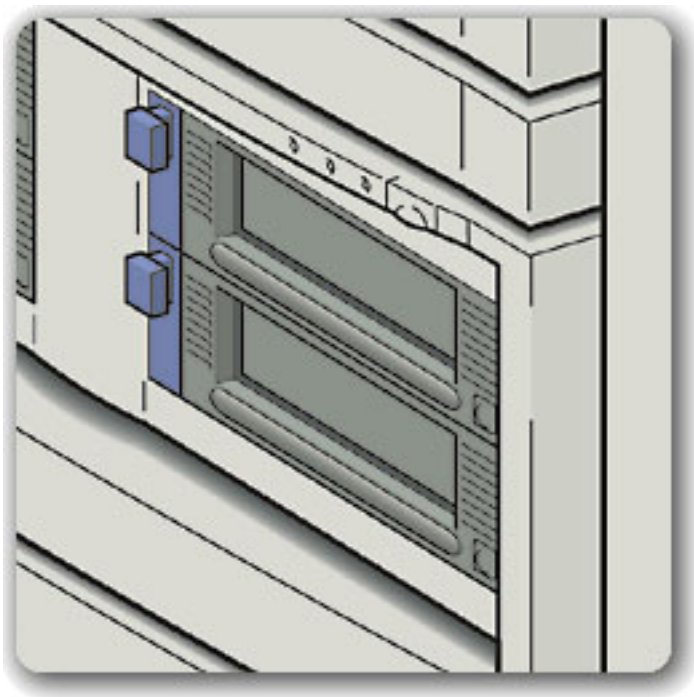
Choose your model from the bulleted list below

Internal Drives

- HP Surestore DLT VS80i tape drive

External Drives

- HP Surestore DLT VS80e tape drive



Removable Drives

- HP Surestore DLT VS80m tape drive

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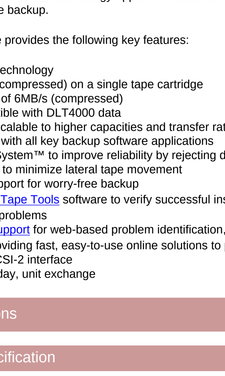
features



The HP Surestore DLT VS80 tape drive provides affordable 80GB backup to IT managers with mid-range servers. The 6MB/s compressed transfer rate provides backup in under 4 hours. DLT technology appeals to customers looking for reliable and scalable backup.

Your new tape drive provides the following key features:

- Proven DLT technology
- Up to 80GB (compressed) on a single tape cartridge
- Transfer rate of 6MB/s (compressed)
- Read compatible with DLT4000 data
- Technology scalable to higher capacities and transfer rates
- Compatibility with all key backup software applications
- TapeSense System™ to improve reliability by rejecting damaged media
- Roller design to minimize lateral tape movement
- TapeAlert support for worry-free backup
- HP Library & Tape Tools software to verify successful installation and troubleshoot problems
- HP Instant Support for web-based problem identification, diagnosis and resolution providing fast, easy-to-use online solutions to problems.
- Ultra wide SCSI-2 interface
- 3-year, next-day, unit exchange

specifications

physical specification

dimensions	148.2 mm (5.83") W (with bezel) 43.8 mm (1.73") H (with bezel) 221.0 mm (8.70") D (with bezel)
weight	1.35 kg (2.98 lbs)

power requirements

power consumption	+5V @ 1.6A steady state +12V @ 0.65A steady state +5V @ 1.9A (max) +12V @ 2.7A (max)

performance

interface	Ultra wide SCSI-2
recording format	DLT1
media	DLTtape IV
capacity	40 GB (native)
sustained transfer rate	native 3 MB/sec compressed 6 MB/sec (assumes 2:1 compression)
burst transfer rate	20 MB/sec (Ultra wide SCSI-2)
file access time (from BOT)	68 sec typical 135 sec maximum
load to BOT	59 sec (slightly longer for blank tapes)
unload from BOT	17 sec 68 sec typical
rewind time	135 sec maximum
rewind tape speed	4.1 m/sec (160 in/sec)

operating limits

temperature	10°C to 40°C (50°F to 104°F)
humidity	20% to 80% RH (non-condensing) 10%/hr maximum operating humidity rise
maximum wet bulb temperature	25°C
temperature gradient	11°C per hour (across range)
operating altitude	-0.15 to 9 km (-500 to 30,000 ft)
vibration	0.25g 5-500 Hz
shock survival	10g 10ms (half sine)

non-operating limits

temperature	-40°C to 66°C (-40°F to 151°F)
humidity	10% to 95% RH (non-condensing)
temperature rise	20°C per hour with 5 degree margin (across range)
humidity rise	10%/hr
non-operating altitude	N/A
vibration	1g 10-500 Hz
shock survival	40G 10ms (square wave) 140G 2ms (half sine)

safety and electromagnetic compatibility

- UL 1950, 3rd edition Information Technology Equipment (ITE)
- CSA-C22.2 No. 950-95 Safety of Information Technology Equipment
- FCC Rules and Regulations, Part 15--Radio Frequency Devices, Subpart B--Unintentional Radiators, Class B
- Industry Canada (ICES), Radio Interference Regulation, Digital Apparatus, Class B
- C-TICK, AS/NZS A3548, Radio Frequency Devices Class B
- CISPR Publication 22 (1985), Class B
- EN 55022: 1998, CISPR Publication 22 (1997), CISPR Publication 22 (1993) (U.S.A.), Radiated and Conducted Emissions
- EN55024: 1998, CISPR Publication 24 (1997), IEC61000-4-2: 1995, IEC61000-4-3: 1995, IEC61000-4-5: 1995, IEC61000-4-6: 1996, IEC61000-4-8: 1993, IEC61000-4-11: 1994, Immunities.

CE-Mark comprised of the following requirements:

- EN60950/A11: 1997, IEC60950/A4: 1996, Safety of Information Technology Equipment including Electrical Business Equipment
- EN55082-1/IEC1000-4-2, 1000-4-3, 1000-4-4, Electromagnetic Compatibility for Industrial-Process Measurement and Control Equipment:

  Part 2 - Electrostatic Discharge (ESD) Requirements
  Part 3 - Radiated Electromagnetic Field Requirements
  Part 4 - Electrical Fast Transient/Burst (EFT) Requirements

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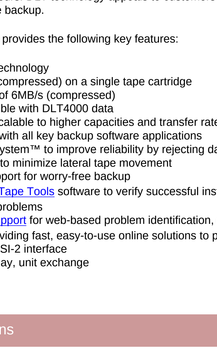
features



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- TapeAlert support for worry-free backup
- HP Library & Tape Tools software to verify successful installation and troubleshoot problems
- HP Instant Support for web-based problem identification, diagnosis and resolution providing fast, easy-to-use online solutions to problems.
- Ultra wide SCSI-2 interface
- 3-year, next-day, unit exchange

specifications

physical specification

dimensions	212.1 mm (8.35") W 66.2 mm (2.61") H 272.5 mm (10.73") D
weight	3.5 kg (7.72 lbs)

power requirements

power	100-254 VAC 50/60 Hz 0.9A Auto-ranging. Power connection IEC CEE-22

performance

interface	Ultra wide SCSI-2
recording format	DLT1
media	DLTtape IV
capacity	40 GB (native)
transfer rate	native 3 MB/sec compressed 6 MB/sec (assumes 2:1 compression)
burst transfer rate	20 MB/sec (Ultra wide SCSI-2)
file access time (from BOT)	68 sec typical 135 sec maximum
load to BOT	59sec (slightly longer for blank tapes)
unload from BOT	17 sec
rewind time	68 sec typical 135 sec maximum
rewind tape speed	4.1 m/sec (160 in/sec)

operating limits

temperature	10°C to 40°C (50°F to 104°F)
humidity	20% to 80% RH (non-condensing) 10%/hr maximum operating humidity rise
maximum wet bulb temperature	25°C
temperature gradient	11°C per hour (across range)
operating altitude	-0.15 to 9 km (-500 to 30,000 ft)
vibration	0.25g 5-500 Hz
shock survival	10g 10ms (half sine)

non-operating limits (storage ranges)

temperature	-40°C to 66°C (-40°F to 151°F)
humidity	10% to 95% RH (non-condensing)
temperature rise	20°C per hour with 5 degree margin (across range)
humidity rise	10%/hr
non-operating altitude	N/A
vibration	1g 10-500 Hz
shock survival	40G 10ms (square wave) 140G 2ms (half sine)

safety and electromagnetic compatibility

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- Industry Canada (ICES), Radio Interference Regulation, Digital Apparatus, Class B
- C-TICK, AS/NZS A53548, Radio Frequency Devices Class B
- CISPR Publication 22 (1985), Class B
- EN55022: 1998, CISPR Publication 22 (1997), CISPR Publication 22 (1993) (U.S.A.), Radiated and Conducted Emissions
- EN61000-3-2: 1995, +Amendment A1: 1998, +Amendment A2: 1998,
- IEC 61000-3-2: 1995, +/A1: 1997, +/A2: 1998, Harmonic Current Emissions
- EN61000-3-3: 1995, IEC61000-3-3: 1994, Voltage Fluctuation and Flicker
- EN55024: 1998, CISPR Publication 24 (1997), IEC61000-4-2: 1995, IEC61000-4-3: 1995, IEC61000-4-5: 1995, IEC61000-4-6: 1996, IEC61000-4-8: 1993, IEC61000-4-11: 1994, Immunities

CE-Mark comprised of the following requirements:

- EN60950/A11: 1997, IEC60950/A4: 1996, Safety of Information Technology Equipment including Electrical Business Equipment
- EN55082-1/IEC1000-4-2, 1000-4-3, 1000-4-4, Electromagnetic Compatibility for Industrial-Process Measurement and Control Equipment:

  Part 2 - Electrostatic Discharge (ESD) Requirements
  Part 3 - Radiated Electromagnetic Field Requirements
  Part 4 - Electrical Fast Transient/Burst (EFT) Requirements

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hp surestore DLT VS80m

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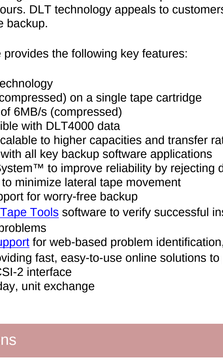
features



The HP Surestore DLT VS80 tape drive provides affordable 80GB backup to IT managers with mid-range servers. The 6MB/s compressed transfer rate provides backup in under 4 hours. DLT technology appeals to customers looking for reliable and scalable backup.

Your new tape drive provides the following key features:

- Proven DLT technology
- Up to 80GB (compressed) on a single tape cartridge
- Transfer rate of 6MB/s (compressed)
- Read compatible with DLT4000 data
- Technology scalable to higher capacities and transfer rates
- Compatibility with all key backup software applications
- TapeSense System™ to improve reliability by rejecting damaged media
- Roller design to minimize lateral tape movement
- TapeAlert support for worry-free backup
- HP Library & Tape Tools software to verify successful installation and troubleshoot problems
- HP Instant Support for web-based problem identification, diagnosis and resolution providing fast, easy-to-use online solutions to problems.
- Ultra wide SCSI-2 interface
- 3-year, next-day, unit exchange

specifications

physical specification

dimensions	205 mm (8.07") W 68 mm (2.68") H 290 mm (11.42") D
weight	1.75 kg (3.86 lbs)

power requirements

power consumption	+5V @ 1.6A steady state +12V @ 0.65A steady state +5V @ 1.9A (max) +12V @ 2.7A (max)

performance

interface	Ultra wide SCSI-2
recording format	DLT1
media	DLTtape IV
capacity	40 GB (native)
sustained transfer rate	native 3 MB/sec compressed 6 MB/sec (assumes 2:1 compression)
burst transfer rate	20 MB/sec (Ultra wide SCSI-2)
file access time (from BOT)	68 sec typical 135 sec maximum
load to BOT	59 sec (slightly longer for blank tapes)
unload from BOT	17 sec 68 sec typical
rewind time	135 sec maximum
rewind tape speed	4.1 m/sec (160 in/sec)

operating limits

temperature	10°C to 40°C (50°F to 104°F)
humidity	20% to 80% RH (non-condensing) 10%/hr maximum operating humidity rise
maximum wet bulb temperature	25°C
temperature gradient	11°C per hour (across range)
operating altitude	-0.15 to 9 km (-500 to 30,000 ft)
vibration	0.25g 5-500 Hz
shock survival	10g 10ms (half sine)

non-operating limits

temperature	-40°C to 66°C (-40°F to 151°F)
humidity	10% to 95% RH (non-condensing)
temperature rise	20°C per hour with 5 degree margin (across range)
humidity rise	10%/hr
non-operating altitude	N/A
vibration	1g 10-500 Hz
shock survival	40G 10ms (square wave) 140G 2ms (half sine)

safety and electromagnetic compatibility

- UL 1950, 3rd edition Information Technology Equipment (ITE)
- CSA-C22.2 No. 950-95 Safety of Information Technology Equipment
- FCC Rules and Regulations, Part 15--Radio Frequency Devices, Subpart B--Unintentional Radiators, Class B
- Industry Canada (ICES), Radio Interference Regulation, Digital Apparatus, Class B
- C-TICK, AS/NZS A3548, Radio Frequency Devices Class B
- CISPR Publication 22 (1985), Class B
- EN 55022: 1998, CISPR Publication 22 (1997), CISPR Publication 22 (1993) (U.S.A.), Radiated and Conducted Emissions
- EN55024: 1998, CISPR Publication 24 (1997), IEC61000-4-2: 1995, IEC61000-4-3: 1995, IEC61000-4-5: 1995, IEC61000-4-6: 1996, IEC61000-4-8: 1993, IEC61000-4-11: 1994, Immunities.

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media compatibility

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- data cartridge compatibility
  - cartridges previously used in other dlt format drives
  - subsequent use in other dlt format drives
- cleaning cartridges

related topics

- hp library & tape tools
- hp instant support
- TapeAlert
- cleaning
- care of cartridges

data cartridge compatibility

The following data cartridges can be used for all normal read/write operations:

- A new blank DLTtape IV cartridge. The part number for the HP DLTtape IV cartridge is C5141F. See ordering supplies.
- A DLTtape IV cartridge that has been previously written in a DLT VS80 or DLT1 tape drive

Do **not** use DLTtape III cartridges.

cartridges previously used in other dlt format drives

If DLTtape IV data cartridges have been previously used in other DLT format tape drives (other than DLT VS80 or DLT1 tape drives) then they have a reduced compatibility when used with your DLT VS80 tape drive as shown by the table below:

DLTtape IV cartridge previously written by:	**DLT 4000** plus DLT 7000 and DLT 8000 drives that use the 4000 format	**DLT 7000** plus DLT 8000 drives that use the 7000 format	**DLT 8000** using either the 7000 or 8000 formats	**SDLT**
DLT VS80 compatibility:	**Read**	**None**	**None**	**None**
	Partial Compatibility - data cartridge can be read only.	No compatibility - data cartridge cannot be read / write / overwritten.		

In each case, a data cartridge previously used on a DLT 4000, DLT 7000, DLT 8000 or SDLT tape drive must be bulk erased (magnetically erased) before data can by written to it by a DLT VS80 tape drive

Note: The term DLT format tape drive refers collectively to the DLT1, DLT VS80, SDLT, DLT 4000, DLT 7000 and DLT 8000. HP also refers to these last three drives as DLT 40, DLT 70 and DLT 80 respectively.

subsequent use in other dlt format drives

Once a DLTIV data cartridge has been used in your DLT VS80 tape drive it has full compatibility if subsequently used in a DLT1 (or another DLT VS80) tape drive. However, if subsequent used in other DLT format tape drives then they have a reduced compatibility as shown by the table below:

DLTtape IV cartridge written by DLT VS80:	**DLT 4000**	**DLT 7000**	**DLT 8000**	**SDLT**
Subsequent compatibility in other DLT format tape drives:	**None**	**None**	**None**	**Read**
	No compatibility - data cartridge cannot be read / write / overwritten.			Partial Compatibility - data cartridge can be read only.

In each case, once a data cartridge is used on a DLT VS80 tape drive it must be bulk erased (magnetically erased) before data can subsequently be written to it by a DLT 4000, DLT 7000, DLT 8000 or SDLT tape drive

cleaning cartridges

The DLT VS80 tape drive requires a DLT VS or a DLT1 cleaning cartridge, both of which are light brown in color. Do not use other DLT format cleaning cartridges - these are cream in color.

cleaning tape compatibility with DLT VS80					
DLT VS cleaning tape	**DLT1** cleaning tape	**DLT 4000** cleaning tape	**DLT 7000** cleaning tape	**DLT 8000** cleaning tape	**SDLT** cleaning tape
Yes	**Yes**	**No**	**No**	**No**	**No**

Correct cleaning cartridges will take 90 seconds to clean the drive, and will activate both the ready and media/clean lights. Unsupported cleaning cartridges will be ejected by the DLT VS80 tape drive after 20 seconds, and will only cause the ready light to flash.

DLT VS80 drives have been developed to have a minimal cleaning requirement (see cleaning). The **CLEAN/MEDIA** LED on the tape drive front panel will flash when the drive needs cleaning. Under typical conditions, the drive should seldom require cleaning. However, high duty cycles and environmental conditions may require the drive to be cleaned on a regular basis to ensure optimum performance is maintained, and it is therefore considered good practice to clean the drive approximately every two weeks.

DLT VS or DLT1 cleaning cartridges can clean the drive 20 times before they need replacing. The part number for the DLT VS cleaning cartridge is C7998A. See ordering supplies.

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diagnostics

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- hp library & tape tools diagnostic utility
  - installing
  - using
  - compatibility
  - firmware updates
    - using hp library and tape tools to update firmware
    - using a firmware update cartridge

diagnostic tools

HP offers a choice of diagnostic tools and web based support to meet your needs:

- HP instant support is a web-based automated problem identification, diagnosis and resolution tool that also incorporates seamless transmission of hardware information and case history to HP Support Specialists at any time you choose to contact HP directly.

  HP instant support is available from: www.hp.com/go/instantsupport

- HP Library & Tape Tools is a standalone diagnostics tool that provides a number of utilities for getting information about your tape drive and troubleshooting problems. It also gives advice to help you install your product and maintain optimum performance throughout the product's life.

  HP Library & Tape Tools is available from: www.hp.com/support/tapetools

- HP support web pages give details of common customer issues.

  Access the HP support website at: www.hp.com/go/support/dltvs80

which tool to use

The table below will help you choose which tool to use:

	HP instant support	HP Library & Tape Tools	HP support web pages
What is it?	regularly updated online web based interactive	regularly updated downloadable from the web standalone	regularly updated online
When should you use it?	If you: can connect to the web want interactive support want automated diagnostics and resolution	If you: can connect to the web want to run selective diagnostics want to choose the solution applied	If you: can connect to the web want summaries and solutions to common customer issues

hp instant support

HP Instant Support is a web-based problem identification, diagnosis and resolution service providing fast, easy-to-use online solutions. The onboard "smart search" tool identifies similar problems and provides a range of solutions and probability statistics for each solution. HP Instant Support provides automated downloads of software utilities and repair patches from HP database and allows you to transfer your case history electronically should you choose to contact HP directly. You can determine the type and amount of support required. It will diagnose desktop and mobile PC systems, workstations, servers, storage devices and printers. HP Instant Support is a value-added service available from HP at no charge.

HP Instant Support requires:

- Microsoft® Internet Explorer 4.0 or later, or Netscape Communicator® 4.6 or later
- troubleshooting software (approximately 4 MB), which must be downloaded from the Instant Support web page

No additional special software or hardware, or additional memory is required.

You can access HP Instant Support from:

- the product support web page (www.hp.com/support/dltvs80)
- the instant support home page (www.hp.com/go/instantsupport)

Follow the unscreen instructions and download the HP Instant Support tuner.

Currently, HP Instant Support is only available in North America, Europe, Africa and the Middle East (English only) and only for systems running on Windows NT 4.0 or Windows 2000. The service will be expanded worldwide and across further operating systems during 2001.

hp library & tape tools diagnostic utility

The HP Library & Tape Tools software provides a number of utilities for getting information about your tape drive and troubleshooting problems. It includes the following functionality:

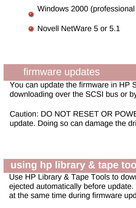
- Installation help and advice to help you install your product and operate it correctly
- A **Discovery** utility to find out what devices are attached to your SCSI bus
- An **Identity** utility to find out detailed information about individual devices, for example the firmware version.
- **Tests** to check that your drive is operating correctly.
- **A Firmware Update Utility** that helps you find update files for your tape drive and performs the update
- **A Support Ticket** that generates detailed troubleshooting information for support calls (if you are connected to the Internet, you will be able to e-mail this information directly to your Support Center)
- Comprehensive **Help** that is topic sensitive, should you need additional information for the screen currently displayed

Updates and the latest versions of this software are available from our World Wide Web site: www.hp.com/support/tapetools

installing hp library & tape tools

You can install HP Library & Tape Tools from the web site: www.hp.com/support/tapetools. The tool is distributed without firmware and firmware files are downloaded separately. Installation is simply a question of selecting the required option and following the instructions on the screen.

using hp library & tape tools



HP Library and Tape Tools checks for the presence of a SCSI controller and its driver software and identifies the SCSI IDs of existing SCSI devices. You can then select the required device from the device list and run one of the diagnostic utilities for that device by selecting the appropriate icon: Identity, Firmware, Test or Support.

For ease of use, comprehensive online help is built into the software.

compatibility

There are HP Library & Tape Tools versions for:

- Windows NT 4.0 (workstation and server)
- Windows 2000 (professional and server)
- Novell NetWare 5 or 5.1

firmware updates

You can update the firmware in HP Surestore DLT VS80 tape drives either by downloading over the SCSI bus or by loading a firmware update cartridge.

Caution: DO NOT RESET OR POWER CYCLE THE DRIVE during firmware update. Doing so can damage the drive's controller hardware.

using hp library & tape tools to update firmware

Use HP Library & Tape Tools to download via SCSI. Any tape in the drive will be ejected automatically before update. The Write Protected and Ready LEDs flash at the same time during firmware update for about two to three minutes.

Note: If a corrupt or incompatible image is downloaded for firmware update then the Write Protected and Ready LEDs do not flash. The drive resets and leaves the code update cartridge loaded to indicate that the code update was not successful.

using a firmware update cartridge

Firmware update tapes are only available from HP. Refer to the Hewlett-Packard Support web site for update information (www.hp.com/support/dltvs80).

To update the firmware from tape:

1. Locate the firmware update cartridge.
2. Remove all DLTtape cartridges from your DLT VS80 drive.
3. Press and hold the Eject button on your DLT VS80 drive's front panel until all three LEDS illuminate (6 seconds) and continue to hold down until the lights go off (4 seconds). Release the Eject button.
4. Press and hold the Eject button again (4 seconds) until the Write Protected and Ready LEDs flash, then release the Eject button. The drive is now in firmware update mode. If you decide not to perform a firmware update at this point, no action is necessary. The drive returns to its normal operational state after 30-45 seconds of inactivity. If the drive does not go into the update mode, refer to the troubleshooting information on update mode.
5. Insert the code update cartridge into the drive. The drive temporarily turns off the Write Protected and Ready LEDS while it reads the cartridge and verifies that the firmware image file is valid. This process may take several minutes to complete.
   - If the drive's code is up-to-date, the drive cancels firmware update mode, and the process is complete.
   - If the drive's code is *not* up-to-date, the drive reads the code image file from the cartridge. The Write Protected and Ready LEDs flash at the same time during the update process which typically takes two to three minutes.

   When the drive finishes reading the code image file from the update cartridge, the drive rewinds the cartridge to the beginning, resets, and performs a Power-On Self-Test (POST). The drive then ensures that the code image file is valid. If so, it updates the controller's flash EEPROM. The Write Protected and Ready LEDs flash at the same time during theupdate process.
6. The drive ejects the code update cartridge. Your DLT VS80 drive is now ready to use with the new code.

Note: If the drive does not eject the code update cartridge, the firmware update failed. For troubleshooting information, refer to code update failed.

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tape alert

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- TapeAlert
  - how it works
  - TapeAlert for OpenView
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  - summary

TapeAlert

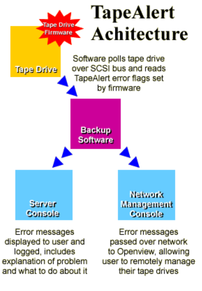
Tape storage systems have a vital role to play in backing up essential data safely and securely. Yet until now, there has been no reliable way to identify errors and potential problems that may compromise their effectiveness or reliability.

Thanks to a new industry standard developed by Hewlett-Packard, however, that situation has changed. TapeAlert is a tape drive status monitoring and messaging utility that makes it easy to detect problems which could have an impact on backup quality. From the use of worn-out tapes to defects in the drive hardware TapeAlert provides easy-to-understand warnings of errors as they arise, and suggests a course of action to remedy the problem.

To take advantage of TapeAlert, you need:

- TapeAlert-compatible tape drives
- TapeAlert-compatible backup software

Network administrators will also find it extremely valuable to have TapeAlert for OpenView, which extends the benefits of TapeAlert across the network.


TapeAlert Achitecture
Tape Drive Firmware
Tape Drives
Software polls tape drive over SCSI bus and reads TapeAlert error flags set by firmware
Backup Software
Server Console
Network Manegment Console
Error messages displayed to user and logged, includes explanation of problem and what to do about it
Error messages passed over network to Openview, allowing user to remotely manage their tape drives

how it works

TapeAlert compatible tape drives - such as the latest DLT VS80 drives from Hewlett-Packard - are delivered with TapeAlert features built in as standard. The internal TapeAlert firmware constantly monitors the drive hardware and the media, checking for errors and potential difficulties. Any problems identified are flagged on a new SCSI log page, where 64 bytes have been reserved for use by TapeAlert.

After a backup has been completed, the TapeAlert-compatible backup application will automatically read the drive's TapeAlert SCSI log page to check for any problems. If an error is flagged, the backup software displays a clear warning message on the user's screen, and adds the TapeAlert messages to its logs. These messages are standard across all applications that support TapeAlert, and are designed to give clear explanation of the problem and suggested resolution. For example, a user attempting to backup onto a worn-out tape would encounter the message:

WARNING: The tape cartridge has reached the end of its useful life:

1. Copy and data you need to another tape

2. Discard the old tape

Errors Monitored

TapeAlert currently checks for errors occurring in the following main categories:

- Drive recoverable read problems
- Drive recoverable write problems
- Drive unrecoverable read problems
- Drive unrecoverable write problems
- Drive hardware defects
- Worn-out media
- Expired cleaning tapes
- Wrong media used
- Abnormal error conditions

TapeAlert for OpenView

TapeAlert for OpenView allows you to bring all TapeAlert-compatible tape drives on the network under the control of the network administrator. It integrates all the features and functions of TapeAlert into HP's network management utility, OpenView for Windows. As a result, tape drives can now be monitored and controlled remotely in the same way as other network elements such as disk drives and printers.

With TapeAlert for OpenView installed, error messages flagged by tape drives are passed to the backup applications in the usual way. The software then forwards the information to the network management console through the server's SNMP interface.

An OpenView alarm is then activated on the management console, alerting the network manager to the tape drives problem. The icon for the relevant server will change color, with the color indicating the severity of the alarm as follows:

RED	Critical
YELLOW	Warning
BLUE	Information

TapeAlert for OpenView also provides a graphical view of the tape drives on the selected server. Detailed configuration information is shown, together with a history of previous errors recorded.

For each alarm, TapeAlert provides a brief description of the error, together with the date and time of occurrence and an indication of severity. By clicking on the "More Info" button, it is possible to drill down to details such as the device and media involved, and suggestions for correcting the problem. For consistency and convenience, the error messages are identical to those displayed locally by TapeAlert.

As a result, it is easy for network managers to identify the source of problems occurring on any TapeAlert-enabled drive on the network.

a new standard

TapeAlert has been developed by Hewlett-Packard as a proposed new standard tape drive management. All new tape drives from Hewlett-Packard will be fully compatible with TapeAlert, and many major manufacturers and software companies are expected to adopt the standard. Software companies adopting the standard currently include:

- Computer Associates Software
- Veritas
- Legato
- Novastor

The TapeAlert standard has been designed to allow easy integration into backup applications from any software vendor. Applications which comply fully with the requirements for TapeAlert will be awarded the use of the TapeAlert logo.

Designed for the Future

TapeAlert is an advanced technological standard which provides a comprehensive range of state-of-the-art features and functions. However, it has also been designed to allow considerable expansion and development in the future, as new possibilities and opportunities open up.

summary

Reliable, high-quality backups are essential to safeguard the vast amount of data stored on computer systems today. TapeAlert is an innovative standard that enhances reliability by monitoring tape drives and associated media during backup procedures.

Offering clear warnings of problems as they arise, TapeAlert allows users and network managers to eliminate unnecessary errors and ensure that data integrity and security is never compromised. Already gaining substantial support across the industry, TapeAlert is set to become the established standard for tape drive management.

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troubleshooting

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    - the tape drive does not power up
    - all the LEDs on the front panel blink continually
    - errors for which you cannot find the cause
  - problems during firmware update
    - drive does not go into firmware update mode
    - code update failed
  - interpreting the LEDs
  - general use
    - backups are slow
    - poor data compression ratio
    - software compatibility
    - problems writing to tape
    - tape being ejected
    - system crashes when swapping removable drives

related topics

- HP library & tape tools
- HP instant support
- TapeAlert
- firmware upgrades

help diagnosing the problem

If you experience problems using your tape drive after installation, use HP Library & Tape Tools or HP instant support to help you diagnose the problem. HP Library & Tape Tools is provided free of charge and is invaluable for solving problems with both the SCSI bus and its attached devices. It will help resolve SCSI ID numbers and also run some tests that may help you isolate problems.

HP instant support is a web-based problem identification, diagnosis and resolution service providing fast, easy-to-use online solutions. You can access HP instant support from www.hp.com/go/instantsupport.

You will also find troubleshooting information on the HP Support web site.

The HP Support web site contains links to:

- www.hp.com/support/dltvs80 takes you to HP's Customer Care web site for a wide range of up-to-date information about your product
- www.hp.com/cpso-support/guide/psd/cscinfo.htm takes you to HP's worldwide call center numbers

general guidelines

If you experience problems when using the tape drive, you need to isolate the cause of the problem. For example, if you have just installed a new SCSI host bus adapter and your system will not start, the cause of the problem is likely to be the adapter.

When installing multiple items of hardware and software, we recommend that you install each in turn and restart the system each time. Similarly if you have already installed multiple devices and software and you experience problems, remove or uninstall each in turn to establish which one is causing the problem.

Remember that the system recognizes devices during boot-up. If you swap or connect a product when your system is running, you will need to reboot the system. Rebooting the system will reset devices and will often resolve problems. It is good practice to reboot every time you add a driver or install firmware.

troubleshooting

The first step in problem-solving is establishing whether the problem lies with the cartridge, the drive, the host computer and its connections, or with the way the system is being operated. If none of the following advice helps you solve the problem, refer to our World Wide Web Customer Care pages on www.hp.com/support/dltvs80 or call for assistance.

problems with the host computer

Most modern SCSI host bus adapters locate and display attached devices when the system is booting up. If the device is not detected at this stage, there is probably a problem with the physical hardware: cables, termination, connections, power or the HBA itself. Refer to the SCSI topic for a detailed discussion of SCSI IDs, termination and cabling.

If your drive is found on system boot up but cannot be found in the operating system, this is more likely to be a software problem.

computer does not boot up

Possible cause	Potential solution
You have connected the tape drive to an existing SCSI bus that has other devices connected to it and the SCSI address of your HP Surestore DLT VS80 drive is identical to the address used by another device.	Make sure that each device on the SCSI bus has a unique ID. We recommend that the HP Surestore DLT VS80 tape drive is connected to a dedicated host bus adapter. Do not connect the drive to a disk RAID controller as this is not supported.
You have installed an additional SCSI host bus adapter and its resources are clashing with an existing adapter.	Remove the new host bus adapter and check the server documentation
You have disconnected the power or SCSI cable from the computer's boot disk during the drive installation process.	Check that the cables to all devices are firmly connected.

computer boots, but does not recognize the tape drive

Possible cause	Potential solution
The power or SCSI cable is not connected properly.	Check that the cables to the tape drive are firmly connected. Ensure that the SCSI cable is LVDS-compliant and that it does not have any bent pins. Replace, if necessary. (See "Ordering Information".)
The SCSI bus may not be terminated correctly.	1. If your HP Surestore DLT VS80 drive is the last or only device on the SCSI bus, make sure the device is properly terminated. 2. If your HP Surestore DLT VS80 drive is not the last or only device on the SCSI bus, check all SCSI cable connections and make sure the last device on the SCSI bus is terminated.
The tape drive's SCSI ID address is not unique.	Identify the SCSI IDs of existing SCSI devices by using HP Library & Tape Tools. Change the drive's SCSI ID. Shut down and turn off the host server or workstation; turn off the desktop drive. Change the drive's SCSI ID. Turn on the host server or workstation and desktop drive.

External drives only: the tape drive may have been switched on after the computer was booted up. The computer checks for SCSI devices only at power-on.	Switch on the tape drive, then switch the computer off and then on again.
The SCSI adapter may be incorrectly configured.	Check the SCSI host adapter configuration. Refer to the SCSI host adapter manuals for instructions.
The SCSI cable may be loose.	Check both ends of the SCSI cable, both for the desktop and internal drives.
The SCSI terminator might be loose or missing.	1. Make sure the terminator is properly seated on the open SCSI connector on the rear panel of the desktop drive or on the last device on the SCSI bus. 2. Make sure an LVD or SE terminator is in place on the end of the SCSI ribbon cable for the internal drive.
The SCSI terminator might not be at the end of the SCSI bus or more than two terminators might be present on the SCSI bus.	Make sure the terminators are placed only at each end of the SCSI bus--one at the host adapter and one on the last device on the bus, both internal and external.
The SCSI host adapter might be in a defective expansion slot.	Move the SCSI host adapter to a different expansion slot.
The SCSI bus might be too long.	Make sure the total length of the SCSI bus does not exceed the ANSI SCSI standard of 3 meters (10 feet) for an SE bus, 12 meters (40 feet) for an LVD SCSI bus with multiple devices, or 25 meters (82 feet) for an LVD SCSI bus with a single device.

problems with the drive

tape drive does not power up

Possible cause	**Potential solution**
The power cable is not connected properly.	Check that the cables to the tape drive are firmly connected. Make sure that the power cable is firmly connected. • For internal drives, try another power connector. • For external drives, the power on/off switch incorporates a green LED. If this is not on, check the power cable connection and replace the cable if necessary. You can use the power cable from your monitor or another device to check that the connection is working.

	If the power supply is present and all LEDs remain off, call for assistance.
The self-test fails (All three LEDS flashing.)	If there is a cartridge in the drive, remove it. Power down the drive and power it up again. If the self-test still fails, call for assistance.

all the LEDs on the front panel blink continually

Possible cause	Potential solution
An internal drive fault has occurred.	1. Press and hold the Eject button for 6 seconds to reset the drive. 2. Turn the drive off and then on again. If the drive is a HP Surestore DLT VS80 internal drive, shut down and turn off the host server or workstation, then turn it back on and allow it to boot. 3. Call technical support if Power-On Self-Test (POST) continues to fail.

errors for which you cannot find the cause

Possible cause	Potential solution
The AC power source may not be properly grounded. (HP Surestore DLT VS80 external drive only.)	1. Plug the HP Surestore DLT VS80 external drive's power cable into a power outlet on the same circuit as the host server or workstation. 2. Plug the HP Surestore DLT VS80 external drive's power cable into a different power outlet.

problems during firmware update

drive does not go into firmware update mode

Possible cause	Potential solution
There is a DLTtape cartridge in the drive.	Remove the cartridge from the drive and repeat the update process.
The drive and its controller hardware are not communicating properly.	The drive's hardware may be damaged and must be repaired. Refer to our World Wide Web Customer Care pages on www.hp.com/support/dltvs80 or call for assistance.

code update failed

Possible cause	Potential solution
1. The cartridge is not a valid code update cartridge 2. The cartridge does not contain a valid code update image file.	Obtain a valid code update cartridge and repeat the update process.
The cartridge contains a valid code update image file, but the flash EEPROM programming process fails.	The drive's controller hardware is probably damaged and must be replaced. The drive resets and runs Power-On Self-Test (POST) which fails if the flash EEPROM does not contain a valid code image. If this occurs, you must repair the drive before using it. Refer to our World Wide Web Customer Care pages on www.hp.com/support/dltvs80 or call for assistance.

interpreting the LEDs

The HP Surestore DLT VS80 tape drive has three LEDs (light emitting diodes) on the front panel which indicate drive status. The Ready switch is illuminated when power is switched on.

The tape drive performs a power on Power-On Self-Test (POST) whenever power is applied or the drive is reset. The test takes several seconds to complete, after which the drive is ready to use. The following takes place during POST:

1. The LEDS turn on all at once and then turn off.
2. If a cartridge is loaded, the Ready LED flashes during initialization and remains illuminated after POST.
3. If there is no cartridge loaded, all LEDs turn off after POST.

Use the following table to interpret the LED sequences and the appropriate action to take.

Symptom	Action
Drive fails to execute power-on self-test. LEDs remain off.	Check power is being supplied to the drive. For external drives, the power on/off switch incorporates a green LED. If this is not on, check the power cable connection and replace the cable if necessary. You can use the power cable from your monitor or another device to check that the connection is working. For internal drives try another power connector. If the power supply is present and all LEDs remain off, contact the HP Customer Care Center.
The "ready" LED is illuminated or is regularly flashing.	This is perfectly normal. The ready light is on when there is power to the drive, and flashes in a regular on/off pattern when there is read/write activity occuring.
The "media/clean" LED is illuminated.	The drive may need cleaning. Load the DLT VS80 cleaning cartridge.
The "media/clean" LED is flashing.	Either the drive requires cleaning (in which case insert a DLT VS or DLT1 cleaning cartridge) or the media being used is damaged or worn out (replace). If the LED persists in flashing, use HP Library and Tape Tools to help diagnose further.
The "drive error" LED is illuminated.	Either the drive is experiencing internal problems (in which case switch the power off then on) or there is a drive fault (in which case contact the HP Customer Care Center.
All three LEDs are illuminated.	The Power On Self Test (POST) is in progress. This is normal.
All three LEDs are flashing.	The Power On Self Test (POST) has experienced a problem. Try turning the power off then on. If the problem persists, contact the HP Customer Care Center.
The "drive error" and "ready" LEDs are flashing.	The drive is performimg a firmware upgrade. DO NOT power down the drive during this process as permanent damage can result.

backups are slow

Possible cause	Potential solution
The block size is too small.	The HP Surestore DLT VS80 is optimized for use with large block sizes. Block size specifies the size of data blocks written onto tape and is set by the backup application. A block size of at least 32 kBytes should be used. Block sizes of less than 32 kBytes can drastically increase the backup/restore time and severely affect the performance of the drive. Most backup applications allow you to view and adjust the block size used for a particular device. Refer to your backup application documentation or provider to ensure it is set to at least 32 kBytes.
The backup is being performed over a network.	Backing up across a network is likely to reduce the speed of the backup. Try backing up at a different time of day when there is less network traffic. Where possible, use a dedicated tape drive directly attached to the computer being backed up. Backing up local data (that is data residing on disk drives attached to the same machine as the tape drive, but not necessarily on the same SCSI bus) is almost always faster than backing up over a network. External tape drives can be moved and attached to different servers.
The overall system is not capable of providing data fast enough.	Tape drive performance will be impaired if the server is slow or overloaded. Even if the system is well specified, there can still be bottlenecks that restrict overall performance. Ensure as few processes as possible are running while a backup is being performed. Backup operations and virus scans should NOT be performed at the same time. Information on optimizing performance is given at //www.hp.com/support/dltvs80

Disk drives are on the same SCSI bus as the tape drive.	Disks tend to monopolize the SCSI bus and should be set to a lower SCSI ID such as 0 or 1. Ideally, the tape drive should be on its own SCSI channel or bus (separate from the disks being backed up).
The SCSI adapter is incorrectly set-up.	Check your SCSI adapter set-up and ensure you have the latest drivers and software patches installed.
Damaged or worn media.	If the media is damaged, the tape drive may perform many retries before successfully writing or reading data. Try using new media.

poor data compression ratio

Possible cause	**Potential solution**
Data is already compressed or can only be compressed to a small degree.	Optimum tape drive performance is normally quoted assuming that the data can be compressed by a factor of two (referred to as 2:1 compression). However, some computer data is already compressed and therefore cannot be compressed further. Other data can only be compressed by a small degree depending on type. It is not possible to improve the compression of data.
Compression is disabled.	Some backup software applications allow compression to be turned on and off. Ensure that it is turned on.

software compatibility

Possible cause	Potential solution
It is unclear which software can be used with the HP Surestore DLT VS80 tape drive.	The HP Surestore DLT VS80 tape drive is widely supported by most common backup applications. Refer to //www.hp.com/go/connect for the latest information on compatability.
Existing software does not work with the HP Surestore DLT VS80 tape drive.	Older software (released before the HP Surestore DLT VS80 was introduced) may need to be updated. Refer to //www.hp.com/go/connect for the latest information on software downloads.

problems writing to tape

Possible cause	Potential solution
The tape is write protected.	Move the write protect tab out from the write protected position. When in the write protected position, the bright orange area is exposed.
The wrong type of media is being used.	DLTtape IV cartridges previously written by a DLT 4000 (or another DLT drive but in DLT 4000 format) will appear write protected. This is correct behaviour. These cartridges can be read but not written by the HP Surestore DLT VS80 tape drive. Refer to the media compatability page for more information.

tape being ejected

Possible cause	Potential solution
The tape has been written in an incompatible format.	Certain non-compatible data cartridges will be ejected by the tape drive. Use only DLTtape IV cartridges in the HP Surestore DLT VS80 tape drive that are either new or have only previously been used in DLT1 or DLT VS80 format tape drives. Refer to the media compatability page for more information.

system crashes when swapping removable drives

Possible cause	Potential solution
Exchanging a tape drive instaled in a HP Surestore Tape Array 5300 enclosure has disrupted activity on the SCSI bus.	Rack mounted tape drive modules must only be extracted or swapped when the SCSI bus is idle. Even if the device being swapped is not currently in operation, care must be taken that there are not other devices on the bus that are in use.

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frequently asked questions

For further troubleshooting information, refer also to our Customer Support web site: http://www.hp.com/support/dltvs80

How often should I clean the tape drive heads?

Clean when advised by the tape drive when the "clean/media" LED is illuminated.

To pre-emp the "clean/media LED being illuminated, HP recommends that the drive is cleaned once every two weeks to ensure optimum performance.

Use only DLT VS or DLT1 cleaning cartridges to clean the heads. Refer to Cleaning for details.

What should I avoid when positioning the tape drive?

For internal drives, the server must provide forced cooling and be capable of drawing 2 cfm of air through the tape drive. Avoid blocking air vents. Ensure that empty bays have the appropriate blanking plates installed so that airflow is maintained.

For external drives, do not place the drive in a dirty environment, for example, on the floor, near a busy walkway, or near a door. Avoid locations subject to sudden temperature changes, such as near an outside door or window.

For specific environmental limits, refer to the specifications for your tape drive model.

How many times can I use a DLTtape IV cartridge?

The recommended maximum number of passes over any single part of the tape is 1,000,000. In practical terms, this is equivalent to about 2,000 backup operations.

What types of tape cartridges can I use with my drive?

Only rely on the best media to protect your valuable data. Thanks to HP's rigorous testing programs, HP DLTtape IV data and DLT VS cleaning cartridges are the safest investment you can make.

Order online at: www.hp.com/go/storagemedia.

Important: You must use DLT VS cleaning cartridges with HP Surestore DLT VS80 tape drives.

How do I update the firmware?

Periodically, there may be an updated release of drive firmware.

You can update the firmware in HP Surestore DLT VS80 tape drives either by downloading over the SCSI bus or by loading a firmware update tape. See Firmware Updates.

For how long can I archive tapes?

DLTtape IV cartridges will preserve the integrity of stored data for at least 30 years if proper storage conditions are observed. See Storing Cartridges.

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SCSI configuration

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summary of SCSI terminology

Note: this section discusses SCSI tape drive devices in general, although specific reference is made to the particular SCSI requirements of HP Surestore DLT VS80 tape drives where appropriate.

Various terms are used when describing SCSI devices. This section provides a brief summary. See What is SCSI for a more detailed discussion of the different SCSI specifications.

There are three main factors that affect performance and cable length:

- The speed of the data bus, which may be Fast, Ultra or Ultra 2.
- The width of the data bus, which may be Narrow or Wide.
- The voltage level of the interface, which may be single-ended (SE) or low voltage differential (LVD).

HP Surestore DLT VS80 drives are Ultra SCSI-2 wide devices designed to operate on a low voltage differential SCSI bus (LVDS) with a burst transfer rate of 40 MB/sec. Using the drive on a single-ended SCSI bus restricts performance. Do not use on the same bus as other single-ended devices as this will switch the LVDS host adapter into single-ended mode and restrict performance.

See SCSI Cables for more information about cable lengths.

setting up the SCSI bus

Each device on a SCSI bus, including the SCSI host bus adapter (HBA), must be configured with a unique ID (identifier).

Note: HP recommends that a dedicated host bus adapter is used for the tape drive. A suitable adapter is available from HP as an accessory (see Ordering Information).

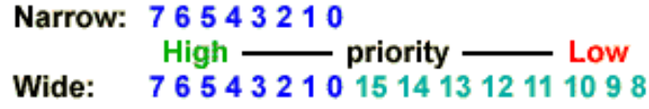
SCSI ID numbers

SCSI IDs are numbered as follows:

- For wide SCSI buses, the ID will be a number from 0 through 15, so a typical wide SCSI HBA can accommodate up to fifteen other devices.
- For standard, narrow SCSI buses, the ID will be a number from 0 through 7, so a typical narrow SCSI HBA can accommodate up to seven other devices.

SCSI IDs are usually set on the device itself (sometimes via configuration software), but some newer devices are capable of selecting an unused ID automatically when powered-up (these are known as "SCAM" devices). HP Surestore drives are not SCAM compliant.

SCSI ID 7 is reserved for the HBA because it has the highest priority on the bus. On wide buses, the priority runs from 7 (highest) to 0, then 15 down to 8 (lowest).



identifying SCSI IDs

If your computer already has devices connected to the SCSI bus, you will need to know their IDs to avoid any conflict with the new tape drive. Here are some methods of finding out the information:

- The fastest and easiest way is to run HP Library & Tape Tools. HP Library & Tape Tools will check your SCSI configuration, including the SCSI controller itself and any devices currently attached to it.
- Most computers display a list of SCSI devices and IDs during the boot-up process. This usually scrolls past very fast. If you press the [Pause] key, you should be able to halt the scrolling and view the list.
- If you have an Adaptec host adapter in the computer, it may have come with a Windows utility called SCSI Interrogator (SHOWSCSI.EXE) which displays information about connected devices.
- If you have Windows NT installed, select SCSI Adapters from the Control Panel, select a device in the Devices tab and click on Properties to view information about the device, including its SCSI ID.

- If you have Novell NetWare installed, use its LIST DEVICES command.

If none of these is available to you, try the following sources of information:

- The details of all installed devices and settings may have been written down and stored with your computer's documentation (for new computers, this is often done by the supplier).
- Your HBA's documentation should tell you which settings it uses.
- Look at each device to find out its ID. This is usually easy with external devices. With internal devices, you will probably need the help of the device's documentation to identify the SCSI ID setting, which is usually set with jumpers.

Setting the SCSI ID

- On internal HP Surestore drives, set the SCSI ID by attaching or removing jumpers at the rear of the drive.
- On external HP Surestore DLT VS80 drives, the ID is displayed on the rear panel and can be set by using a small screwdriver or a ball-point pen to press the little buttons above and below the number.
- On removable HP Surestore DLT VS80 drives, the ID is set on the back of the tape array.

For all cases, see the *Getting Started Guide* for more details. Note that host adapters check SCSI IDs only at power-on, so any changes will not take effect until the host system is power-cycled.

SCSI termination

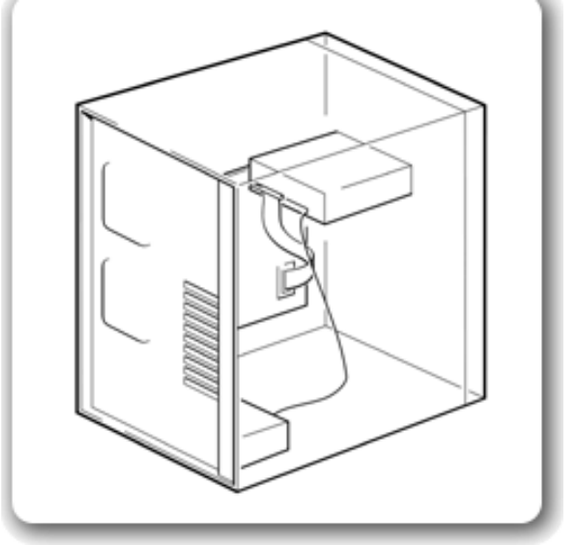
Terminators are essential, as they provide the correct voltages on the SCSI bus and prevent unwanted signal reflections from interfering with data transfers. The rule is:

There must be termination at both physical ends of the bus and only at the ends.

There are two main types of termination, active and passive. Active terminators reduce interference and allow faster data throughput. On devices with high transfer speeds, such as HP Surestore DLT VS80 drives, active termination is required.

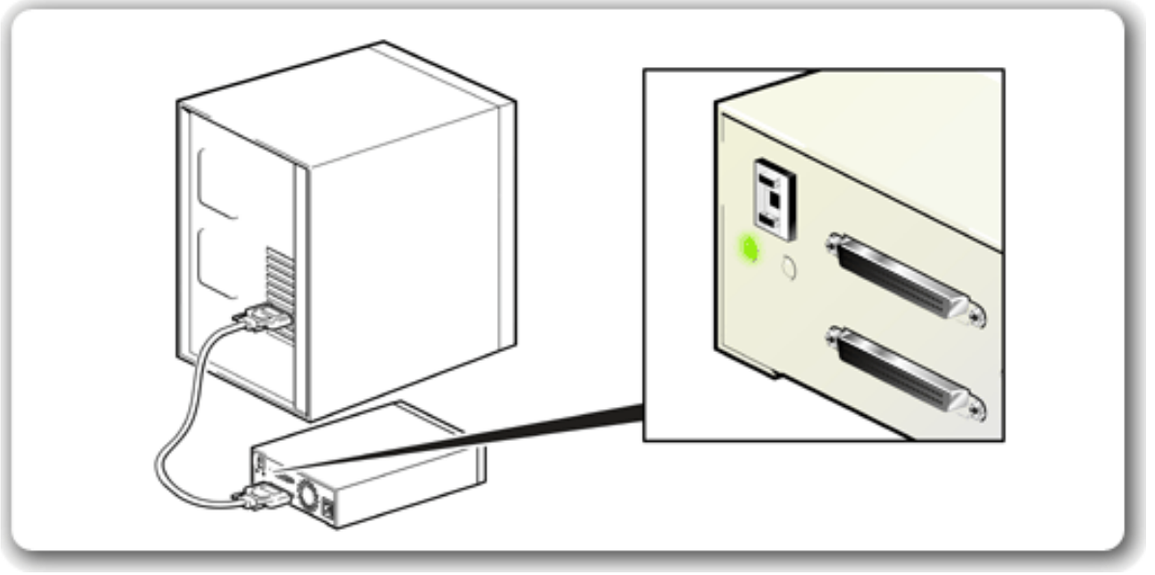
Correct termination can be achieved in four ways:

- **Using the host bus adapter:** Often the HBA forms one end of the SCSI bus and provides termination.



If you have both internal and external devices attached to the same SCSI bus, the HBA will be in the middle of the cable and thus its termination must be disabled. See the host bus adapter's documentation for details of how to do this.

- **Using a terminated SCSI cable:** Usually the internal SCSI cable in a PC-based server has a number of SCSI connectors along its length and a terminator at the end farthest from the host bus adapter. In this case, you must ensure that any devices attached to the cable have termination removed or disabled.
- **Using a terminator attached to the last device on the bus:** For other external devices, the terminator simply attaches to the spare SCSI connector of the last device.



termination power

SCSI terminators require power to function, which is supplied along the SCSI cable from one or more of the connected devices. Most host adapters provide power by default.

If you are using long SCSI cables and some of the devices do **not** provide termination power, it is best to connect these to the middle of the cable, so that devices which **do** provide termination power are nearer the ends of the cable, and thus closest to the terminators themselves.

plug and play adaptor cards

Most plug-and-play adapter cards have an auto-termination feature which, when the adapter is in the middle of the bus, can detect the terminators situated at either end of the SCSI bus and automatically turn off the on-board termination.

SCSI cables

Cables matter in SCSI systems. There are two factors to consider:

cable length

- For LVD SCSI there is a maximum permissible length of 25 meters for a single device. With multiple devices the maximum combined internal/external length is 12 meters.
- For best performance, keep lengths to a minimum, but avoid very short overall lengths (less than 0.5 meters).

cable quality

It is important to use good quality cables. Generally speaking, cable quality affects performance and reliability. This is particularly true for external, shielded cables.

For HP Surestore DLT VS80 internal drives, you need a SCSI ribbon cable with the correct termination. The drives have a 68-pin wide, high-density SCSI connector. If you are using an HP Surestore DLT VS80 drive on an internal bus with other peripherals that run at Ultra2 speeds, it is important that a 68-pin LVD-compatible ribbon cable is used.

The cable provided with HP Surestore DLT VS80 external tape drives will attach to a computer with a wide LVDS SCSI connector (68 pins). If your server or host bus adapter is equipped with a very high density (VHD) wide SCSI connector, you will need to order a 68-pin HD-to-VHD converter or 68-pin HD-to-VHD cable. See Ordering Information.

Look after your SCSI cables. In particular, take care when connecting or disconnecting not to damage the high-density connectors. Avoid putting excessive twists in external shielded cables, as this can cause premature failure.

what is SCSI?

The Small Computer Systems Interface (SCSI) is popular because it offers a fast and flexible method of connecting a variety of devices to a host computer. The SCSI standards define both the physical connections between the devices (cables and connectors) and the protocols devices use to communicate with each other.

the standards

There have been three general standards:

- **SCSI-1**, which is now obsolete
- **SCSI-2**, which is very common, and still a current standard
- **SCSI-3**, which is an emerging set of linked standards that define much more than the simple bus systems used by the earlier versions. SCSI-3 includes Fibre Channel, Wide SCSI, FireWire (IEE 1398), Low Voltage Differential (LVD or LVDS), and Fast Serial SCSI. Some of these standards are now being used on PC platforms

Another variant is **ATAPI**, which uses an EIDE physical bus to pass SCSI protocols to connected devices. Technically, this is not part of the SCSI-3 standards, although some operating systems (notably Windows NT) manage ATAPI devices as if they were fully SCSI.

SCSI is a backward-compatible standard, so that SCSI-2 and SCSI-3 devices can almost always be made to work together.

SCSI is a ***bus*** interface: all the devices are connected to a single cable (some of this may be inside and some outside the host computer's case). The connection to the host itself is known as the Host Bus Adapter (HBA). You can have several HBAs in a single computer, each with its own SCSI bus: this is a common arrangement in high-performance servers. Some host bus adapters (such as the Adaptec 3940W) have more than one SCSI bus available on a single card.

SCSI in hp surestore tape drives

HP Surestore DLT VS80 drives are Ultra SCSI-2 wide devices designed to operate on a low voltage differential SCSI bus (LVDS) with a burst transfer rate of 40 MB/sec.

using wide and narrow devices together

Narrow SCSI devices can transfer data one byte at-a-time (and are sometimes called "8-bit SCSI" devices). They can conform to either the SCSI-2 or SCSI-3 protocols. They have a 50-pin connection to the SCSI bus.

Wide SCSI devices can transfer two bytes of data simultaneously ("16-bit SCSI"). They usually have a single, 68-pin connection to the SCSI bus. (This physical arrangement is part of the SCSI-3 specification.) They may support either SCSI-2 or SCSI-3 protocols.

Wide and narrow devices can simultaneously be connected to the same bus without problem, provided certain rules are followed.

Using HP Surestore DLT VS80 drives on a narrow bus will restrict performance.

Narrow devices used on a wide bus will not normally affect the performance of any wide devices connected

using SE and LVD, ultra and ultra 2 devices together

SE and LVD define how the signals are transmitted along the cable.

With **single-ended (SE) SCSI**, each signal travels over a single wire and each signal's value is determined by comparing the signal to a paired ground wire. Signal quality tends to decrease over longer cable lengths or at increased signal speed.

With **low voltage differential (LVD) signaling**, signals travel along two wires and the difference in voltage between the wire pairs determines the signal value. This enables faster data rates and longer cabling with less susceptibility to noise than SE signaling and reduced power consumption.

Using HP Surestore DLT VS80 drives on a single-ended SCSI bus restricts performance. Do not use on the same bus as other single-ended devices as this will switch the LVDS host adapter into single-ended mode and restrict performance to SE speeds and SE cable length.

If you connect only LVD devices, the bus will operate in low voltage differential mode and Ultra2 speeds will be enabled. You can use a combination of Ultra and Ultra2 devices. Each device will operate at its optimum speed.

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UNIX configuration guide

UNIX configuration

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This topic is available in English only. Click in the top right-hand corner to close the window and return to the tape drive user's guide.

hp | compaq | ibm RS/6000

pc based UNIX | silicon graphics | sun

This guide provides basic information on configuring HP tape drives with various operating systems. The table below lists the models for which this information is appropriate.

Model	**Type**	**Maximum Capacity** (assuming 2:1 compression)	**Identifier String for UNIX Configuration***
HP Surestore Ultrium 230	Ultrium drive	200 GB	HP------Ultrium**
HP Surestore Ultrium 215	Ultrium drive	200 GB	HP------Ultrium**
HP Surestore DAT24	DDS drive	24 GB	HP------C1537A**
HP Surestore DAT 24x6	DDS autoloader	24 GB on each cartridge	HP------C1557A**
HP Surestore DAT40	DDS drive	40 GB	HP------C5683A**
HP Surestore DAT40x6	DDS autoloader	40 GB on each cartridge	HP------C5713A**
HP Surestore DLT 80	DLT drive	80Gb	QUANTUM-DLT8000**
HP Surestore DLT1	DLTvs drive	80Gb	BNCHMARKDLT1**
HP Surestore DLT VS80	DLTvs drive	80Gb	BNCHMARKDLT1**

***Drive Identification in UNIX Configuration:** These strings should be used in UNIX scripts wherever the drive type has to be identified. There are no hardware configuration switches.

** Dashes (-) indicate spaces

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HP-UX systems (series 700 only)

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- determining the SCSI ID
- creating the device files

related topics

- verifying installation
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installing the device driver

If this is the first time a tape device has been installed on the system, it is likely that the *stape* device driver has not been built into the kernel.

On a system with a graphical (X) interface, the simplest way to add the driver to the kernel is to use the "System Administration Manager" (SAM). To run this type *sam* from the command prompt while logged in as a super-user.

When the administrator interface appears, go to:

Kernel Configuration -> Drivers

Scroll down to *stape* on the left hand side, if its "current state" is *Out*, highlight the row and from the menu bar select:

Actions -> Add driver(s) to kernel

The system will then construct a new kernel, and a reboot will be required.

determining the SCSI id

Before you configure your system to support your new HP Surestore drive, you need to determine what SCSI ID to use. The SCSI ID must be unique for each device attached to the SCSI bus. To list the existing devices, use the following command:

% /sbin/ioscan -f

The output of this should look similar to the following example:

Class	I	H/W Path	Driver	S/W State	H/W Type	Description
bc	0		root	CLAIMED	BUS_NEXUS	
graphics	0	1	graph3	CLAIMED	INTERFACE	Graphics
ba	0	2>	bus_adapter	CLAIMED	BUS_NEXUS	Core I/O Adapter
ext_bus	0	2/0/1	c700	CLAIMED	INTERFACE	Built-in SCSI
target	2	2/0/1.4	tgt	CLAIMED	DEVICE	
disk	0	2/0/1.4.0	sdisk	CLAIMED	DEVICE	TOSHIBA CD-ROM XM-34
target	3	2/0/1.6	tgt	CLAIMED	DEVICE	
disk	1	2/0/1.6.0	sdisk	CLAIMED	DEVICE	HP C2490A
lan	0	2/0/2	lan2	CLAIMED	INTERFACE	Built-in LAN
:	:	:	:	:	:	:

After you have installed the new tape drive, you can check that it has been attached successfully. From a shell window (hpterm/xterm), execute *ioscan* to display the list of attached devices.

For an HP Surestore Ultrium, execute the following:
% /sbin/ioscan -f | grep "Ultrium"

The new lines should look similar to the following, where the 4 in the I field represents the instance of the SCSI tape driver, not the SCSI ID:

Class	I	H/W Path	Driver	S/W State	H/W Type	Description
tape	4	2/0/1.5.0	stape	CLAIMED	DEVICE	HP------Ultrium

note: For other devices, substitute "Ultrium" in the command as follows:

DLT1 = "DLT1"
DAT devices = "C----A"

```
Note: Change "C----A" to the appropriate value for your DAT
device. DAT24 drives ="C1537A"; DAT40 drives="C5683A"; DAT24x6
autoloaders="C1557A"; DAT40x6 autoloaders="C5713A".
```

The description changes accordingly.

creating the device files

Once you have verified the tape drive connection, you will need to create the appropriate device files for the drive. Normally, you would have rebooted your system after attaching the tape drive, and this process runs `insf`. However, if you have *not* rebooted your system since attaching the drive, you should run `insf` as follows before running `mksf` to create the device files:

```
 % /sbin/insf -C tape
```

If the system onto which the tape drive is being attached, has a graphical interface, the easiest way to create device files is to use the "System Administration Manager". Type *sam* from the command prompt while logged in as super-user.

When the administrator window appears go to:

Peripheral Devices -> Tape Drives

A list of all found tape devices will be displayed, along with the Hardware path and driver. Highlight the drive and from the menu bar select:

Actions -> Create Device Files -> Create Default Device Files

When these are created, they can be viewed by selecting:

Actions -> Show Device Files

A description of what the device files do is given below.

If the system does not have a graphical interface it is possible to create the device files for the devices using the `mksf` command as follows:

```
 % /sbin/mksf -d stape -I <instance> [-n] [-u]
/dev/rmt/X<name>
```

where:

Argument	Description
-d stape	Specifies the SCSI tape driver
-I <instance>	Specifies the tape drive's hardware address via the instance of the SCSI tape driver. The first instance is 0, the second 1, and so on.
[-n]	Specifies no rewind; absence of this parameter indicates rewind mode
[-u]	Specifies Berkeley mode; absence of this parameter indicates AT&T mode. Berkeley and AT&T modes differ in their read-only close behavior: • In Berkeley mode, the tape position will remain unchanged by a device close operation. • In AT&T mode, a device close operation will cause the tape to be repositioned just after the next tape filemark (the start of the next file). In most cases, Berkeley mode should be used.
/dev/rmt/*X*<name>	Specifies the path of the device file, where: *X* Specifies the tape device identifier. Use the next available identifier. You can examine the contents of `/dev/rmt` using the `ls` command to determine which identifiers have already been used. <name> Specifies the short name (in HP-UX 9.x-style) of the device file: mnb No rewind, compression disabled, Berkeley-mode device hnb No rewind, compression enabled, Berkeley-mode device mnb No rewind, compression disabled, Berkeley-mode device hnb No rewind, compression enabled, Berkeley-mode device

See the man page (`man 1m mksf`) for other options of the `mksf` command. The `stape` section covers the SCSI tape driver options. The man page `man 7 mt` describes the long filenames used in HP-UX 10.x.

Example:
To create a device file with the following characteristics:

- A hardware address specified by instance 5 (`-I 5`)
- No rewind (`-n`)
- Berkeley mode tape positioning on close (`-u`)
- A filename of `4mnb`, where 4 is the tape device identifier (`/dev/rmt/4mnb`)

You would execute the following:

```
 % /sbin/mksf -d stape -I 4 -n -u /dev/rmt/4mnb
```

You can check that the appropriate device file was created using the `lssf` command as follows:

```
 % /sbin/lssf /dev/rmt/4mnb
```

This should produce the following output to show that the device file now exists:

```
  stape card instance 0 SCSI target 6 SCSI LUN 0 berkeley no
rewind
  BEST density at address 2/0/1.6.0 /dev/rmt/4mnb
```

Once the device files have been created, you should confirm that your new tape drive is working properly. See Verifying Installation.

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Compaq systems, Digital UNIX

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configuring for Digital UNIX

1 Add the following entry to your `/etc/ddr.dbase` file:

```
SCSIDEVICE
Type = tape
Name = "HP" "Ultrium"
```

note: For other devices, substitute "Ultrium" in the command as follows:

DLT1 = "DLT1"
DAT devices = "C----A"

```
Note: Change "C----A" to the appropriate value for your
DAT device. DAT24 drives ="C1537A"; DAT40
drives="C5683A"; DAT24x6 autoloaders="C1557A"; DAT40x6
autoloaders="C5713A".
```

2 Set the following parameters in the file:

```
PARAMETERS:
MaxTransferSize = 0xffffff
ReadyTimeSeconds = 600
InquiryLength = 0x20
DENSITY:
DensityNumber = 0,3
DensityCode = 0x00
Blocking = 0
CompressionCode = 0x0
Buffered = 0x1
DENSITY:
DensityNumber = 1,2
OneFileMarkOnClose = yes
DensityCode = 0x00
Blocking = 0
CompressionCode = 0x1
Buffered = 0x1
```

3 Rebuild the kernel by running:

```
% /sbin/ddr_config -c /etc/ddr.dbase
```

then reboot the system with the tape drive attached. The device files for the Ultrium drive will be generated when you reboot.

4 The names of the device files can be interpreted as follows:

For Tru64 (Digital) UNIX 4.x

Device files will be generated in the /dev directory in the following format

`[n]rmtX D`

where:

n No rewind
rmt Magnetic tape identifier
X Instance number assigned to the drive by the operating system (0 is the first, 1 is the second, and so on)
D Density number mapping letter one of h, l, m or a
h Compression on (high density, maps to density number 1)
m Compression off (medium density, maps to density 2)
l Compression off (low density, maps to density number 0)
a Compression on (alternate density, maps to density 3)

For example, `/dev/rmt/nrmt0h` is a device file for the first device, which is a high-density, no-rewind device.

For Tru64 (Digital) Unix 5.x:

Device files will be generated in **`/dev/tape`** or **`/dev/ntape`** directories for rewind or no-rewind devices in the following format

tapeX	density number 0 driver without compression
tapeXc	density number 0 driver with compression
tapeX_dY	density number d driver (compression controlled by ddr.dbase file)

where:

X drive instance number (0 is the first drive)

Y density number

In the case of Ultrium customers will only need to use the tape0 and tape0c device files.

Once the device files have been created, you should confirm that your new tape drive is working properly. See Verifying Installation.

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IBM RS/6000 AIX

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- configuring the device files
  - device file names under AIX

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determining the SCSI id

Before you configure your system to support your new HP Surestore drive, you need to determine what SCSI ID to use. The SCSI ID must be unique for each device attached to the SCSI bus. To list the existing devices, use the following command:

% lsdev -C |grep SCSI

This will produce output that looks similar to:

scsi0 Available 00-00-0S Standard SCSI I/O Controller
hdisk0 Available 00-00-0S-0 1.0 GB SCSI Disk Drive
rmt1 Defined 00-00-0S-2,0 Other SCSI Tape Drive

The SCSI ID is in the series 00-00-0S-X,0 where X is the SCSI ID. Review the list of existing SCSI IDs and choose an available ID to assign to your new tape drive.

configuring the device files

To install the HP Surestore Ultrium drive on an IBM workstation running AIX, you will need to create the appropriate device files for the drive.

note: Do *not* choose the `smit` option of "`4mm2gb`" as the Tape Device Type. This is reserved for Connor drives. If you use it with HP drives, you will get the error "`Device to be configured does not match the physical device at the specified connection location`".

To change to variable block mode, use the following procedure:

1. *If you are using a graphics terminal* running X-Windows, then at a Windows terminal, type: `smit tape`
   If you are using a non-graphics terminal, at the command line type:
   `% smit -C tape`
2. If no device has been configured at this address before, select "`add a tape drive`" to set up the address. From the pop-up window, select "`ost`" or "`Other SCSI tape drive`" as the tape drive you wish to change and choose connection addresses as appropriate.
3. Select from the window: "`change/show characteristics of a tape drive`"
4. From the pop-up window, select "`ost`" or "`Other SCSI tape drive`" as the tape drive you wish to change. Do *not* choose "`4mm2gb`".
5. Change the block size field to 0, and click on the "`DO`" button or press [Enter] to apply the change.

HP drives will work with `tar`, `cpio`, `backup`, `restore` and `dd`. For systems other than the 43P, the drive is also boot-capable, provided a boot tape is generated using `mkszfile` and `mksysb`.

Once the device files have been created, you should confirm that your new tape drive is working properly. See Verifying Installation.

device file names under AIX

Use device filenames as listed below for the combination of Rewind on Close, Retension on Open, and Compression that you want:

Filename	Rewind on Close	Retension on Open	Compression
/dev/rmt*n*	Yes	No	enabled
/dev/rmt*n*.1	No	No	enabled
/dev/rmt*n*.2	Yes	Yes	enabled
/dev/rmt*n*.3	No	Yes	enabled
/dev/rmt*n*.4	Yes	No	disabled
/dev/rmt*n*.5	No	No	disabled
/dev/rmt*n*.6	Yes	Yes	disabled
/dev/rmt*n*.7	No	Yes	disabled

The *n* in the filename is the instance number assigned to the drive by the operating system, where 0 is the first device, 1 is the second and so on.

Rewind on Close Normally, the drive repositions the tape to BOT (Beginning of Tape) when the device file is closed. Using the no rewind option is useful when creating and reading tapes that contain multiple files.

Retension on Open Retensioning consists of winding to EOT (End of Tape) and then rewinding to BOT, in order to reduce errors. If this option is selected, the tape is positioned at BOT as part of the open process. Ultrium drives do not require retensioning, so you should not use device fields that send retensioning commands.

Compression Compression can be disabled or enabled.

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PC Based UNIX, SCO and Linux

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determining the SCSI id (Linux)

Look at the output of dmesg to find out what SCSI channel number is used for each connection.

To find out the SCSI IDs in use on each channel, run:
cat /proc/scsi/scsi

This will produce output similar to the following for each device:

Attached devices:
Host: SCSI0 Channel:00 Id:00 Lun:00
Vendor: HP Model ----------
Type: Direct-Access ANSI SCSI Revision 02

Look at the ID information to establish which IDs are in use.

configuring for Linux systems

No changes are needed to support HP Surestore drives on Linux platforms, however you should ensure that you have the relevant drivers loaded.

To see the device drivers loaded currently, execute an `lsmod` command, this will give output like:

```
Module Size Used by
sgm 4376 1
ide-scsi 7200 0
lockd 30792 1
sunrpc 53316 1
st 24656 0
ncr53c8xx 52096 1
aic7xxx 136184 2
```

The lines of interest here are:

st	This is the tape driver. Its presence in the output of the lsmod command shows that the tape driver is loaded.
ncr53c8xx	This is a SCSI chipset driver for the LSI Logic family of HBAs (amongst others).
aix7xxx	This is a SCSI chipset driver for the Adaptec 7xxx chipset family (such as Adaptec 2940UW).

In order to communicate with a tape device, the operating system needs to have drivers for the tape and the underlying transport mechanism (the host bus adaptor) loaded. Ensure that both are available as either loadable modules (for example, usable with `insmod` and visible with `lsmod`) or are statically built into your kernel.

In order to determine if the drive has been detected by the tape driver at module load time, execute:

```
dmesg | grep "st"
```

This should find a number of lines. One should look like:

```
Detected SCSI tape st0 at scsi1, channel 0, id 5, lun 0
```

To load the tape driver module if it is not loaded as above, execute:

```
insmod st
```

to load it. This should happen naturally if your system is rebooted after attaching the drive.

In order to enable large transfers under Linux (>64 KB per write), edit the file `/usr/src/linux/drivers/scsi/st_options.h` and change the definition of `ST_BUFFER_BLOCKS`.

If you want requests to space to end of data to be faster, you should also enable `ST_FAST_MTEOM` in the same file. After changing this file, rebuild the modules and install the new binary. At the very least, this requires:

```
make modules
make modules_install
```

from the `/usr/src/linux` directory. See your kernel documentation.

configuring for an SCO system

To install the appropriate driver and device files on a SCO system, perform the following steps:

1. Run '`mkdev tape`' as root.
2. Select '`Configure SCSI tape drive`'.
3. Select '`Install tape drive`'.
4. Select the appropriate SCSI adapter.
5. Select the appropriate SCSI bus.
6. Select the Target ID to match the SCSI ID set on the back of the drive.
7. Select the LUN to be 0.
8. Enter 'y' to update the SCSI configuration.
9. Enter the following details:

Vendor identification string:	HP
SCSI version to which the drive conforms:	2
Response Data Format (SCSI-2):	2
Generic device:	1

   This procedure will automatically make the drive the default device, even if another device is already configured.
   You may want to edit `/etc/conf/pack.c/stp/space.c` to change the filemark handling on close. By default, it writes only one filemark for a write filemark `ioctl()`. See the comments in the `space.c` file.
10. Enter 'q' to leave unchanged the boot string that is displayed when the system is rebooted.
11. Enter 'q' to return to the Main Menu.
12. Enter 'q' to quit.
13. You are now prompted to rebuild the kernel and the kernel environment (which includes the device files). Perform both steps by answering 'y' when prompted, and select the new kernel to be booted by default.
    You can now use one of the following files, as appropriate, for backup operations:

    /dev/nrStp*X* if you require a no-rewind device
    /dev/rStp*X* if you require a rewind device
    where *X* is the instance number as assigned to the drive by the operating system (0 is the first device, 1 is the second, and so on).

controlling compression with SCO

Because SCO does not have any compression/no-compression device files, you must use '`tape setcomp`' to control the compression status of the drive as follows:

Command	Compression	Decompression
tape -a 0 setcomp	disabled	disabled
tape -a 1 setcomp	enabled	disabled
tape -a 2 setcomp	disabled	enabled
tape -a 3 setcomp	enabled	enabled

If you have multiple drives, you must specify the appropriate device files in the command. For example:

```
% tape -a 0 setcomp /dev/nrStp2
```

Use '`tape getcomp`' to tell you the current status of the drive.

note: Do *not* use the SCO '`mt`' utility. This is obsolete, and does not perform the same function as '`mt`' on other platforms. Use '`tape`' to achieve the same result.

improving performance through block size on SCO

In order to improve performance, specify larger blocking factors for `cpio` and `tar`. Use the 'b' option of `tar` with an argument of 20 or use the 'B' option of `cpio`. For example:

```
% tar cvbf 20 /dev/rStpY ./*
```

or

```
% find / -print | cpio -ocB > /dev/rStpY
```

or, if you have a version of SCO UNIX earlier than 5.x:

```
% find / -print | cpio -ocB > /dev/rStpY
```

In each case, *Y* is the instance number as assigned to the drive by the operating system (0 is the first device, 1 is the second, and so on).

Alternatively, you can use the `tape` command as follows:

```
% tape -a 32768 setblk <device file>
```

This explicitly sets the block size used for the drive when you are using built-in applications such as `cpio` and `tar`. The `<device file>` is either `/dev/nrStpY` or `/dev/rStpY` as described above.

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Silicon Graphics systems, IRIX

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determining the SCSI id

Before you configure your system to support your new HP Surestore Ultrium drive, you need to determine what SCSI ID to use. The SCSI ID must be unique for each device attached to the SCSI bus. To list the existing devices, use the following command:

% hinv -v | grep SCSI

This will produce output similar to the following:

Integral SCSI controller 0: Version WD33C93B, revision D
Disk drive: unit 1 in SCSI controller 0

In this, "unit X" indicates the SCSI ID. Review the list of existing SCSI IDs and choose an available ID to assign to your new tape drive.

configuring the device files

To install the HP Surestore drive on a Silicon Graphics system running IRIX, you will need to modify the kernel configuration file.

- If you want `tar` to default to short block transfers, change the `512*512` in your `tpsc` or `scsi` HP entry to `128*512` (128-kilobyte blocks) or, better still, `64*512` (64-kilobyte blocks).

1 Open the kernel configuration file `/var/sysgen/master.d/scsi`, for IRIX 6.2 and later, with a text editor.

2 Find the following entry in the kernel configuration file and copy it to a new location in the file where you can edit it as appropriate for your tape drive:

For IRIX 6.2:

Ultrium tape drives

```
{DATTAPE, TPDAT,2,7,"HP","Ultrium",0,0,{0},
MTCAN_BSF|MTCAN_BSR|MTCAN_APPEND|MTCAN_SETMK|MTCAN_PART|
MTCAN_PREV|MTCAN_SYNC|MTCAN_SPEOD|MTCAN_CHKRDY|MTCAN_VAR|
MTCAN_SETSZ|MTCAN_SILI|MTCAN_SEEK|MTCAN_CHTYPEANY|MTCAN_COMPRESS,
/*minimum delay to I/O is 4 minutes, because when a retry is
*performed, the drive retries a number of times, and then
*rewinds to BOT, repositions, and tries again.*/
40, 4*60, 20*60, 5*60, 512, 64*512, 0, (u_char*)0 },
```

DAT tape drives and autoloaders

```
{DATTAPE,TPDAT,2,6,"HP","C----A",0,0,{0},
MTCAN_BSF|MTCAN_BSR|MTCAN_APPEND|MTCAN_SETMK|MTCAN_PART|
MTCAN_PREV|MTCAN_SYNC|MTCAN_SPEOD|MTCAN_CHKRDY|MTCAN_VAR|
MTCAN_SETSZ|MTCAN_SILI|MTCAN_SEEK|MTCAN_CHTYPEANY|MTCAN_COMPRESS,
/*minimum delay to I/O is 4 minutes, because when a retry is
*performed, the drive retries a number of times, and then
*rewinds to BOT, repositions, and tries again.*/
40, 4*60, 20*60, 5*60,512, 64*512, 0, (u_char*)0 },
```

Note: Change "`C----A`" in the first line to the appropriate value for your device. DAT24 drives ="C1537A"; DAT40 drives="C5683A"; DAT24x6 autoloaders="C1557A"; DAT40x6 autoloaders="C5713A".

DLTvs tape drives

```
{DECDLT, TPDLT,8,4,"BNCHMARK","DLT1",0,0,{0},
MTCAN_BSF|MTCAN_BSR|MTCAN_APPEND|
MTCAN_PREV|MTCAN_SYNC|MTCAN_SPEOD|MTCAN_CHKRDY|MTCAN_VAR|
MTCAN_SETSZ|MTCAN_SILI|MTCAN_SEEK|MTCAN_CHTYPEANY|MTCAN_COMPRESS,
/*minimum delay to I/O is 4 minutes, because when a retry is
*performed, the drive retries a number of times, and then
*rewinds to BOT, repositions, and tries again.*/
40, 4*60, 20*60, 5*60, 512, 64*512, 0, (u_char*)0 },
```

For IRIX 6.4/6.5:

Ultrium tape drives

```
{ DATTAPE, TPDAT, 2, 7, "HP", "Ultrium", 0, 0, {0},
MTCAN_BSF|MTCAN_BSR|MTCAN_APPEND|MTCAN_SETMK|MTCAN_PART|
MTCAN_PREV|MTCAN_SYNC|MTCAN_SPEOD|MTCAN_CHKRDY|MTCAN_VAR|
MTCAN_SETSZ|MTCAN_SILI|MTCAN_SEEK|MTCAN_CHTYPEANY,
/* minimum delay on i/o is 4 minutes, because when a retry is
* performed, the drive retries a number of times, and then
* rewinds to BOT, repositions, and tries again. */
40, 4*60, 4*60, 5*60, 3*3600, 512, 512*512,
tpsc_default_dens_count, tpsc_default_hwg_dens_names,
tpsc_default_alias_dens_names,
{0}, 0, 0, 0,
0, (u_char *)0 },
```

DAT tape drives and autoloaders

```
{DATTAPE,TPDAT,2,6,"HP","C----A",0,0,{0},
MTCAN_BSF|MTCAN_BSR|MTCAN_APPEND|MTCAN_SETMK|MTCAN_PART|
MTCAN_PREV|MTCAN_SYNC|MTCAN_SPEOD|MTCAN_CHKRDY|MTCAN_VAR|
MTCAN_SETSZ|MTCAN_SILI|MTCAN_SEEK|MTCAN_CHTYPEANY,
/* minimum delay on i/o is 4 minutes, because when a retry is
* performed, the drive retries a number of times, and then
* rewinds to BOT, repositions, and tries again. */
40, 4*60, 4*60, 5*60, 3*3600, 512, 512*512,
tpsc_default_dens_count, tpsc_default_hwg_dens_names,
tpsc_default_alias_dens_names,
{0}, 0, 0, 0,
0, (u_char *)0 },
```

Note: Change "`C----A`" in the first line to the appropriate value for your device. DAT24 drives ="C1537A"; DAT40 drives="C5683A"; DAT24x6 autoloaders="C1557A"; DAT40x6 autoloaders="C5713A".

DLTvs tape drives

```
{DECDLT, TPDLT,8,4,"BNCHMARK","DLT1",0,0,{0},
MTCAN_BSF|MTCAN_BSR|MTCAN_APPEND|MTCAN_SETMK|MTCAN_PART|
MTCAN_PREV|MTCAN_SYNC|MTCAN_SPEOD|MTCAN_CHKRDY|MTCAN_VAR|
MTCAN_SETSZ|MTCAN_SILI|MTCAN_SEEK|MTCAN_CHTYPEANY,
/* minimum delay on i/o is 4 minutes, because when a retry is
* performed, the drive retries a number of times, and then
* rewinds to BOT, repositions, and tries again. */
40, 4*60, 4*60, 5*60, 3*3600, 512, 512*512,
tpsc_default_dens_count, tpsc_default_hwg_dens_names,
tpsc_default_alias_dens_names,
{0}, 0, 0, 0,
0, (u_char *)0 },
```

For an explanation of the functions of the `MTCAN` values and constants, see "MTCAN and Constants Values".

3 Recompile the kernel by running `autoconfig` and then reboot the system. When you reboot, the device files for the Ultrium drive will be created automatically.

The following device files will be created in `/dev/rmt`:

```
tps0d3          tps0d3cnrv   tps0d3nrns    tps0d3s
tps0d3c         tps0d3cns    tps0d3nrnsv   tps0d3sv
tps0d3cnr       tps0d3cnsv   tps0d3nrs     tps0d3v
tps0d3cnrns     tps0d3cs     tps0d3nrsv    tps0d3stat
tps0d3cnrnsv    tps0d3csv    tps0d3nrv
tps0d3cnrs      tps0d3cv     tps0d3ns
tps0d3cnrsv     tps0d3nr     tps0d3nsv
```

These device file names can be interpreted as follows:

Device Name	Function
c	Compression
nr	No rewind on close
v	Device supports variable block sizes
ns	Device does not byte-swap
s	Device does byte-swap
stat	Allows the device to be used when one of the other device files specifying the same physical device is already opened

For example, the device file `tps0d3` indicates a device on controller card 0 at SCSI ID 3, and the device file `tps0d3nrv` indicates a device on controller card 0 at SCSI ID 3 that does not rewind on close and supports variable block sizes.

Once the device files have been created, you should confirm that your new tape drive is working properly. See Verifying Installation.

MTCAN and constants value

The `MTCAN` values have the following functions:

MTCAN value	Capability Enabled
APPEND	Append to existing tape data
BSF	Backspace file
BSR	Backspace record
CHKRDY	Determine if a tape cartridge is present
CHTYPEANY	Change density and/or fixed to variable at points other than beginning of tape
COMPRESS	Compression
PART	Multiple partitions
PREV	Prevent media removal
SEEK	Seek to a particular block
SETMK	Setmarks
SETSZ	Fixed block size can be set
SILI	Suppress illegal length indicators
SPEOD	Space to EOD (end of data)
SYNC	Synchronous mode SCSI
VAR	Variable block sizes

The constants have the following functions:

Constant	Description
40	Transfer time-out in "inverse ticks"
4*60	Minimum time-out in seconds for any command
4*60	Space command time-out in seconds
5*60	Time-out in seconds for long operations (such as rewinds)
512	Default block size in bytes for fixed block size mode
64*512 or 512*512	Recommended blocking factor in bytes for the upper limit of read/write commands

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Sun Systems 2.x, 5.x, 8

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determining the SCSI id

Before you configure your system to support your new HP Surestore drive, you need to determine what SCSI ID to use. The SCSI ID must be unique for each device attached to the SCSI bus.

1 Check for existing SCSI controllers using the following command:
% modinfo | grep "SCSI"

This will produce output similar to the following:

21 101ea5fa 14d7f 102 1 isp (ISP SCSI HBA Driver 1.205)
25 10207d97 c516 50 1 glm (GLM SCSI HBA Driver 1.154.)

This indicates that there are two SCSI controllers on the system, an ISP-based adapter and a GLM-based adapter. For the adapter to which the new tape drive is attached, you will need to determine what SCSI IDs are already used.

2 Determine the SCSI IDs of the existing devices attached to the SCSI controller:

For all adapters:
% dmesg | egrep ".*xxx.*target" | sort | uniq

where xxx = the type of adapter (esp, glm, fas or isp), as appropriate.

For example, for an ESP-based adapter:
% dmesg | egrep ".*esp.*target" | sort | uniq

This produces a list similar to:
sd0 at esp0: target 0 lun 0 sd6 at esp0: target 6 lun 0

This indicates that SCSI IDs 0 and 6 are used for existing devices. SCSI ID 7 is generally used for the adapter itself. In this situation, you would use a SCSI ID from 1 to 5 for the new tape drive.

configuring the device files

Only if necessary, make the following file modifications to enhance performance:

1 In the file `/kernel/drv/st.conf`, locate these lines:

```
#########
# Copyright (c) 1992, by Sun Microsystems, Inc.
#ident "@(#)st.conf 1.6 93/05/03 SMI"
```

and add the appropriate `tape-config-list =` lines for your tape drive, as follows:

HP Surestore Ultrium drives
(there are 6 significant spaces between `HP` and `Ultrium` in line 2):

```
  tape-config-list =
      "HP      Ultrium", "HP Ultrium", "ULTRIUM",
  ULTRIUM = 1,0x36,0,0xd639,4,0x00,0x00,0x00,0x40,3;

  name="st" class="scsi"
          target=X lun=0;
```

where *X* is the SCSI target address of the device you have attached.

HP Surestore DAT24 drives
(there are 6 significant spaces between `HP` and `C1537A` in line 2):

```
  tape-config-list =
      "HP      C1537A", "HP DDS3 4mm DAT", "HP-data2",
      HP-data2 =
1,0x34,1024,0xd639,4,0x00,0x13,0x24,0x3,3;

  name="st" class="scsi"
          target=X lun=0;
```

where *X* is the SCSI target address of the device you have attached.

HP Surestore DAT24x6 autoloaders
(there are 6 significant spaces between `HP` and `C1557A` in line 2):

```
  tape-config-list =
     "HP      C1557A", "HP DDS3 4mm DATloader", "HP-
data2";
      HP-data2 =
1,0x34,1024,0xd639,4,0x00,0x13,0x24,0x3,3;

  name="st" class="scsi"
          target=X lun=0;
```

where *X* is the SCSI target address of the device you have attached.

HP Surestore DAT40 drives
(there are 6 significant spaces between `HP` and `C5683A` in line 2):

```
  tape-config-list =
      "HP      C5683A", "HP DDS4 4mm DAT", "HP-data2",
      HP-data2 =
1,0x34,1024,0xd639,4,0x00,0x13,0x24,0x3,3;

  name="st" class="scsi"
          target=X lun=0;
```

where *X* is the SCSI target address of the device you have attached.

HP Surestore DAT40x6 autoloaders
(there are 6 significant spaces between `HP` and `Ultrium` in line 2):

```
  tape-config-list =
      "HP      C5713A", "HP DDS4 4mm DATloader", "HP-
data2",
      HP-data2 =
1,0x34,1024,0xd639,4,0x00,0x13,0x24,0x3,3;


  name="st" class="scsi"
          target=X lun=0;
```

where *X* is the SCSI target address of the device you have attached.

HP Surestore SDLT drives

```
  tape-config-list =
      "Quantum SuperDLT1", "HP SDLT", "SDLT",
      SDLT = 1,0x36,0,0xd639,4,0x00,0x00,0x90,0x91,3;

  name="st" class="scsi"
          target=X lun=0;
```

where *X* is the SCSI target address of the device you have attached.

HP Surestore DLTvs drives

```
  tape-config-list =
      "BNCHMARKDLT1", "HP DLT1", "DLT1",
      DLT1 = 1,0x36,0,0xd639,4,0x00,0x00,0x86,0x87,3;

  name="st" class="scsi"
          target=X lun=0;
```

where *X* is the SCSI target address of the device you have attached.

2 If you are replacing an existing tape device on the same SCSI ID, remove the contents of the `/dev/rmt` directory as follows:

```
% cd /dev/rmt
% rm *
```

3 Do a reconfigure boot:

```
% cd /
% touch /reconfigure
% sync;halt
```

4 When the system is down, reboot:

```
% boot -r
```

Make sure you include the `-r` switch, so that the device directory is reconfigured using the new data.

5 You should now be able to use the drive:

- Use `/dev/rmt/Xcb` if you require a compression rewind device file, where *X* is the relevant device address.
- Use `/dev/rmt/Xcbn` when you require a compression non-rewind device.

Once the device files have been created, you should confirm that your new tape drive is working properly. See Verifying Installation.

hp-data values

The values for `ULTRIUM` and `name`, which provide normal LTO mode, have the following meanings:

Value	Meaning
1	This value should be 1.
0x36	Value for an Ultrium drive in `/usr/include/sys/mtio.h`.
0 or 1024	Default block size. For variable block size, use 0 instead of 1024 (except with Solaris 2.3, where you should not use 0).
`0x639` or `0xd639`	A value is derived from constants provided in `/usr/include/sys/scsi/targets/stdef.h`. The value determines which operations the driver can perform with the attached device by using a unique value for each feature and then adding them together to form `0x639`. The features are as follows: 0x001 Device supports variable length records. 0x008 Device can backspace over files (as in the '`mt bsf`' option). 0x010 Device supports backspace record (as in '`mt bsr`'). 0x020 Device requires a long time-out period for erase functions. 0x0200 Device knows when end of data has been reached. 0x0400 Device driver is unloadable. 0x1000 Time-outs five times longer than normal. 0x4000 Driver buffers write requests and pre-acknowledges success to application. 0x8000 Variable record size not limited to 64 KB.
0x00	Default density setting. Creates a device file with compression disabled.
0x40	The density code for data compression enabled by default.
0x86	Density code
0x87	Density code
0x90	Density code specifying 110 GB (no compression)
0x91	The density code for data compression enabled by default (220 GB).
target=X	X specifies the SCSI ID (target) of the device.
lun=0	Specifies the LUN for the device.

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verify the installation

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overview

As part of the installation process, you will have installed the appropriate device driver for your UNIX system and created device files to communicate with the tape drive. This section describes how you can verify that the installation has been performed correctly.

In outline, the procedure is as follows:

1. Write test data to a tape.
2. Read the test data from the tape.
3. Compare the data read from the tape with the original data on disk.

verifying the installation

1. Test the SCSI connection to the tape drive by doing a rewind operation:
   a. If there is a tape cartridge already in the drive, remove it.
   b. Insert a tape cartridge.
   c. Rewind the tape using the command line:
      `% mt -t <archive name> rewind`
      or for SCO UNIX:
      `% tape -a /dev/rStpX rewind`
      If you do not see the Tape light flash as the tape rewinds, the hardware installation may be faulty. Check the troubleshooting section of the appropriate User's Guide for help in identifying the problem.

2. Write a sample file to tape, using '`tar`':
   ```
   % cd /
   % tar cvf <archive name> <file>
   ```
   The options to `tar` have the following meanings:

c	Create a new archive (backup file) on the device.
v	Operate in verbose mode.
f	Specify the archive name explicitly.

   The arguments follow the `cvf` options in the command line. Their values depend on the operating system; suggested values are given in "System-Specific Arguments". The arguments are as follows:

<archive name>	The name of the archive name to be created. *Example:* `/dev/rmt/0m`
<file>	The name of the file to archive, prefixed with '`./`'. *Example:* `./stand/vmunix`

   note Make sure you prefix the file name with '`.`' when you back it up to tape. If you do not, the restore operation in step 3 will overwrite the original copy on disk.

3. Read the file back from tape:
   ```
   % cd /tmp
   % tar xvf <archive name>
   ```
   The '`x`' option to `tar` here means "extract from the archive".
   Use the same value for the `<archive name>` argument as in step 2.

4. Compare the original with this retrieved file:
   `% cmp <original file> /tmp/<retrieved file>`
   This step compares the retrieved file and the original file byte by byte. If they are the same, there should be no output, and this verifies that the installation is correct. The arguments are as follows:

<original file>	The name of the original file, prefixed with '`/`'. *Example:* `/stand/vmunix`
<retrieved file>	The name of the file retrieved from the archive. *Example:* `stand/vmunix`

example

Suppose you are verifying the installation of an HP Ultrium tape drive on an HP-UX 10.X system. The procedure would be as follows. See "System-Specific Arguments" below for the choice of `<archive name>` and `<file>` arguments:

1. Change directory to root:
   `% cd /`
2. Back up `/stand/vmunix` to tape:
   `% tar cvf /dev/rmt/0m ./stand/vmunix`
   Note the prefix of '`.`' to the filename.
3. Change to the temporary directory:
   `% cd /tmp`
4. Extract the file from the tape:
   `% tar xvf /dev/rmt/0m`
5. Compare the original with the restored version:
   `% cmp /stand/vmunix /tmp/stand/vmunix`
   Note that the original filename is *not* prefixed with '`.`'.

system-specific arguments

The following table lists suggested values for the arguments `<archive name>` and `<file>` in the verification procedure described above. If any of the suggested files are symbolic links on your system, choose another file appropriate for your system.

System	File Name	Description	Archive Name	Notes
DEC OSF	vmunix	OSF kernel	/dev/rmt/*Y*m	*Y* is the instance of the drive
HP-UX 10.x	stand/vmunix	HP-UX kernel	/dev/rmt/*Y*m	*Y* is the instance of the drive
IBM AIX	unix	AIX kernel	/dev/rmt*Y*.1	*Y* is the device ID reported back as available when you ran '`smit -C tape`' to create the device files.
SCO	**unix**	SCO kernel	**/dev/rStp*Y***	Use the device file created during the running of '`mkdev tape`', where *Y* is the instance of the tape drive.
Silicon Graphics IRIX	unix	IRIX kernel	/dev/rmt/tpsC*d*X	*C* is the SCSI card *X* is the SCSI ID of the drive
SUN Solaris 2 (SunOS 5.x)	bin/csh	C shell	Determine the archive name as described below*.	
Linux	bin/sh	Bourne shell	/dev/stp	

*For SUN Solaris 2, determine the archive name by typing:
`% ls -l /dev/rmt/*m | grep "st@X"`
where *X* is the SCSI ID. Identify the line for the tape drive. For example, if the drive was at SCSI ID 2, look for the line containing "`st@2,0`". This might be as follows (but on a single line):

```
lrwxrwxrwx 1 root root 63 Mar 1 00:00 /dev/rmt/0m
../../devices/sbus@1f,0/espdma@e,8400000/esp@e,8800000/st@2,0:m
```

Here you could use `/dev/rmt/0m` (shown underlined above) as the archive name.

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glossary

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AT&T mode

Berkeley and AT&T functional modes differ in "read only" close functionality. In AT&T mode, a device close operation will cause the tape to be repositioned just after next tape filemark (the start of the next file).

Berkeley mode

Berkeley and AT&T functional modes differ in "read only" close functionality. In Berkeley mode the tape position will remain unchanged by a device close operation.

Compression

A procedure in which data is transformed by the removal of redundant information to reduce the number of bits required to represent the data. This is done by substituting short codewords for strings of bytes.

Filemark

A mark written by the host to the tape, which can be searched for, often using the drive's fast-search capability. It does not necessarily separate files. It is up to the host to assign a meaning to the mark.

Immediate mode

A mode of responding to SCSI commands where the drive or other peripheral does not wait until the command has finished before returning status information back to the host. When writing filemarks, Immediate mode can significantly improve the performance of systems which do not set the Immediate bit when sending a SCSI WRITE FILEMARKS command. On the other hand, data is not flushed to tape in response to a filemark command.

Infinite flush

By default, the buffer in the drive is flushed every 5 seconds. Infinite flush avoids frequent starting and stopping of the mechanism when using a very slow application. It also avoids losing capacity through the flushing of partly written groups. On the other hand, infinite flush means that data can remain in the buffer for very long periods of time, and could be lost in the event of a power failure.

LUN

Logical Unit Number. A unique number by which a device is identified on the SCSI bus. A tape drive has a fixed LUN of 0. In an autoloader, the changer mechanism is LUN1.

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April 2001

http://www.hp.com/support/tape may have a later version

dlt vs80 tape drive user's guide

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ordering supplies

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SCSI cables

The HP Surestore DLT VS80 external tape drive comes with a 1.5 metre cable for connection to a wide (68-pin) high-density SCSI host.

Should you require an additional cable of the same or different length for connection to the same type of SCSI host, order one of the following:

Item	Description	Part Number
1.0 m external	68-pin high density to 68-pin high density, LVD/SE SCSI cable	A6524A
1.5 m external	68-pin high density to 68-pin high density, LVD/SE SCSI cable	A6525A
2.5 m external	68-pin high density to 68-pin high density, LVD/SE SCSI cable	A6526A

Should you require an additional cable for connection to a wide (68 pin) very high density SCSI host, order one of the following:

Item	Description	Part Number
1.0 m external	68-pin high density to 68-pin very high density, LVD/SE SCSI cable	A6528A
2.5 m external	68-pin high density to 68-pin very high density, LVD/SE SCSI cable	A6529A
5.0 m external	68-pin high density to 68-pin very high density, LVD/SE SCSI cable	A6530A

Should you require an additional terminator, order the following:

Item	Description	Part Number
terminator	68-pin high density LVD/SE multimode SCSI terminator	A6531A

SCSI host adapters

If your system requires an additional SCSI host bus adapter, order the following:

Item	Description	Part Number
High-End Tape Connect Kit	Ultra2 host bus adapter kit for internal and external drives	C7474A

This kit contains everyting you need to connect both an internal and external drive.

rail kits

For mounting an internal drive inside an HP L-series NetServer, the correct tray is supplied with the drive. Most other servers have all the mounting hardware required.

A small number of older machines may require the following to be ordered:

Item	Description	Part Number
rail kit	for Compaq servers	C7469A
rail kit	for Dell PowerEdge servers 2300, 4100, 4200, and 6100	C5732A

media

The following media is recommended for use with the HP Surestore DLT VS80 tape drive:

Item	Description	Part Number
data cartridge	HP DLTtape IV	C5141F
cleaning cartridge	HP DLT VS80	C7998A

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drivers and operating systems

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introduction

This document describes, in a frequently asked questions format, issues relating to drivers and operating systems that may arise when installing your HP Surestore tape drive.

To start, click on one of the above topics or select a topic from the navigation pane on the left. For example, click on **windows NT** for a series of frequently asked questions on setting up a Windows NT server for tape backup with HP Surestore tape drives.

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revision history

Edition	Date	Comments
1.0	February 2001	Initial release in this format

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- why does my autoloader not work correctly with ISV Backup Software, or the Windows NT in-built backup applet?
- why do I get SCSI errors when using my tape drive?
- which HP SureStore tape drives are certified by Microsoft, ISV's and IHV's for use on Windows NT?
- how do I use the built-in Tape Backup applet provided by Microsoft?
- NTBackup quick reference guide

This topic is available in English only

introduction

As with most software development cycles, the Windows NT® network server operating system has been subject to a number of major and minor version releases over time, resulting in a number of different versions of Windows NT now being in common use.

This Frequently Asked Questions (FAQ) document discusses the use of tape drivers for the HP Surestore tape drive product range within the following environments:

Windows NT 3.51
(which may be upgraded by the use of the Windows NT Service Pack 5).

Windows NT 4.0
(which may be upgraded by the use of the Windows NT Service Pack 4).

Both of these versions of Windows NT are shipped with an integral native driver called "4mmDAT.sys". However, Hewlett-Packard recommends that its own tape drivers should be used in all circumstance. These drivers are contained on the relevant HP Surestore CD-ROM. A full range of drivers for Windows NT 3.51, Windows NT 4.0 and Windows 2000 (NT 5.0) covering all relevant HP Surestore tape drives are included. For full details, see the NTReadme.txt file which is also on the HP Surestore CD-ROM.

To check which drivers you are currently running, refer to the answer to the question "How do I know what drivers I am using at the moment, and what drivers do I need for running tape backups?"

For further details on tape drivers in general, refer to the answer to the question "How do tape drivers work within a Windows NT environment?"

It is clear that, irrespective of the operating system version or tape drive vendor, problems are sometimes experienced when users attempt to set up Windows NT systems to perform tape backups.

This "Windows NT Tape Backup Frequently Asked Questions" document attempts to highlight and resolve issues relative to tape drive backup under the Windows NT environment.

It is recommended that you read the whole of this FAQ document rather than just specific questions.

Note - Symbios is now owned by LSI Logic.

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Windows 2000

Hewlett-Packard also supplies certified drivers for use with the native backup application that ships with the Windows 2000 operating system. These drivers are contained on the relevant HP Surestore CD-ROM.

The latest information in support of this operating system can be found at http://www.hp.com/go/connect

native backup applications

Microsoft ships a built-in backup application with Windows NT called NTBackup.

NTBackup supports the backing up of data on local drives and mapped network drives, and allows full / incremental backup strategies & monitoring of the current job. It does not support Autoloaders.

For further details, refer to the answer to the question "How do I use the built-in Tape Backup applet provided by Microsoft?"

Note - Ultrium high performance tape drives: As a general rule, native backup applications (such as NTBackup and tar) do not provide the required data streaming rate to get the full performance of your Ultrium drive. We recommend using a backup application, which provides better memory management as well as other useful features, such as TapeAlert. HP, Computer Associates, Veritas, Legato and Yosemite all provide suitable products that have been tested with your Ultrium drives. For the latest list of backup packages that support your Ultrium drives, please contact your tape drive or library manufacturer.

first question

Go to the first question "How do tape drivers work within a Windows NT environment?"

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frequently asked questions

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- why does my autoloader not work correctly with ISV Backup Software, or the NetWare in-built backup applet?
- why does my ISV Backup Software not give me the option to specify that I am using ".ham" drivers when I install it?
- why do I get SCSI errors when using my tape drive?
- which HP SureStore DAT and DLT tape drives are certified by Novell, ISVs and IHVs for use on NetWare?
- how do I use the built-in Tape Backup applets provided by Novell?

This topic is available in English only

introduction

As with most software development cycles, the Novell NetWare network operating system has been subject to a number of major and minor version releases over time. This has resulted in the widespread use of a number of different versions of NetWare.

Earlier versions made use of a monolithic driver architecture known as DDFS (Device Driver Functional Specification), in which the SCSI HBA and peripherals such as disks and tapes, used drivers having the file extension ".dsk".

Adding new devices to the monolithic architecture was problematic, so Novell introduced a new driver architecture called NWPA (NetWare Peripheral Architecture). With NWPA, a driver having the file extension ".cdm" (custom device module) is used to control the peripheral, and a separate driver having the file extension ".ham" (host adapter module) is used for the SCSI HBA.

Although NWPA was adopted as the system of preference, the "old" DDFS architecture continued to be supported until NetWare Version 5.0. In addition, new minor releases in the NetWare 3.x (NetWare 3.2) and NetWare 4.x (NetWare 4.2) series were subsequently issued with support for both DDFS and NWPA. Downloadable "patches" were also made available to allow users with NetWare 3.12 and NetWare 4.11 to use the new NWPA architecture.

This can be summarised as follows:

NetWare Version	Driver Architecture
NetWare 3.12	DDFS (+ NWPA with Patches)
NetWare 3.2	DDFS and NWPA
NetWare 4.11	DDFS (+ NWPA with Patches)
NetWare 4.2	DDFS and NWPA
NetWare 5.0	NWPA only

For further details, refer to the question "What is the difference between NWPA and the old DDFS ".dsk" architecture, and which architecture is supported by which versions of NetWare?"

It is clear that, irrespective of the operating system version or tape drive vendor, problems are sometimes experienced by users attempting to set up NetWare systems (particularly using NWPA architecture) to perform tape backups. This "NetWare Tape Backup Frequently Asked Questions" document attempts to highlight and resolve many of these issues.

It is recommended that you read the whole of the FAQ document rather than just specific questions.

native backup applications

Novell ships a built-in backup application with it NetWare operating systems.

For NetWare versions prior to NetWare 5.0, the backup applet is called SBackup. It supports scheduling, full / differential / incremental backup strategies and monitoring of "jobs". It does not support Autoloaders.

The NetWare 5.0 backup applet is SBCON. It supports scheduling, full / differential / incremental backup strategies and mid-flow monitoring of "jobs". It also allows backups and restores to be administered from a remote client using the application NWBACK32.EXE. SBCON has Autoloader support built-in.

For further details, refer to the answer to the question "How do I use the built-in Tape Backup applets provided by Novell?"

Note - Ultrium high performance tape drives: As a general rule, native backup applications do not provide the required data streaming rate to get the full performance of your Ultrium drive. We recommend using a backup application, which provides better memory management as well as other useful features, such as TapeAlert. HP, Computer Associates, Veritas, Legato and Yosemite all provide suitable products that have been tested with your Ultrium drives. For the latest list of backup packages that support your Ultrium drives, please contact your tape drive or library manufacturer.

first question

Go to the first question "What is the difference between NWPA (NetWare Peripheral Architecture) and the old DDFS (Device Driver Functional Specification) ".dsk" architecture, and which is supported by which versions of NetWare?"

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- how do I configure a tape drive?
- how do I tell if my tape drives and drivers are correctly set up?
- are there any important points I need to be aware of when changing drivers in my system?
- why does my device not work correctly with ISV Backup Software, or the SCO in-built backup applet?
- which HP Surestore tape drives are certified by SCO, ISV's and IHV's for use on OpenServer?
- why do I get SCSI errors when using my tape drive?
- how do I use the built-in Tape Backup applet provided by SCO?

This topic is available in English only

introduction

SCO is a leading provider of UNIX® network server operating systems.

As with most software development cycles, the UNIX® SCO operating system has been subject to a number of major and minor version releases over time, resulting in a number of different versions of SCO now being in common use.

SCO ships with a number of native tape drivers ("alud", "arad" and "slha"). The particular SCSI host bus adaptor (HBA) used on your system determines which of these drivers is used to control SCSI peripherals such as tape drives. For further details, refer to the answer to the question "How do I know what disk drivers I am using at the moment, and what drivers do I need for running tape backups?"

SCO does not give native support for the HP SureStore DAT24x6 autoloaders. The HP SureStore DAT24x6 autoloaders can be supported instead by using the "mtx" utility supplied by Hewlett-Packard on the HP SureStore CD-ROM disk. For details, refer to the answer to the question "Why does my device not work correctly with ISV Backup Software, or the SCO in-built backup applet?"

It is clear that, irrespective of the operating system version or tape drive vendor, problems are sometimes experienced when users attempt to set up SCO systems to perform tape backups.

This "UNIX SCO Tape Backup Frequently Asked Questions" document attempts to highlight and resolve issues relative to tape drive backup under the UNIX SCO environment.

It is recommended that you read the whole of this FAQ document rather than just specific questions.

Note - Symbios is now owned by LSI Logic.

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native backup applications

There are a number of tape backup applets written for the SCO operating system.

For details, refer to the answer to the question "How do I use the built-in Tape Backup applet provided by SCO?"

Note - Ultrium high performance tape drives: As a general rule, native backup applications do not provide the required data streaming rate to get the full performance of your Ultrium drive. We recommend using a backup application, which provides better memory management as well as other useful features, such as TapeAlert. HP, Computer Associates, Veritas, Legato and Yosemite all provide suitable products that have been tested with your Ultrium drives. For the latest list of backup packages that support your Ultrium drives, please contact your tape drive or library manufacturer.

first question

Go to the first question "How do I know what drivers I am using at the moment, and what drivers do I need for running tape backups?"

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setting up a UNIX linux server for tape backup
with hp surestore tape drives

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- are there any important points I need to be aware of when changing drivers in my system?
- why does my dds autoloader not work correctly with ISV Backup Software, or the Linux in-built backup applet?
- which HP Surestore tape drives are certified by ISV's and IHV's for use on Linux?
- why do I get SCSI errors when using my tape drive?
- how do I use the built-in Tape Backup applet provided by Linux?

This topic is available in English only

introduction

Linux is an operating system developed under the GNU General Public Licence, and its source code is freely available to developers worldwide. It has become increasingly popular, and a large number of individuals and companies are contributing to its expansion by adapting the source code to meet an ever-increasing range of applications and hardware configurations.

The free and open nature of Linux has resulted in a much less formal development structure than in most other operating systems. However, as with most software development cycles, the Linux UNIX® network server operating system has been subject to a number of major and minor version releases over time, resulting in a number of different versions of Linux now being in common use. The current full-featured version of the Linux Kernel is version 2.2, released in January, 1999.

The Linux Generic Kernel should include all necessary SCSI transport drivers, and should provide SCSI HBA and SCSI tape support for standard tape devices without the need for further intervention. Under normal circumstances (unless, that is, you have built your own non-generic kernel) you should not have to add drivers to your system. For further details, refer to the answer to the question "How do I know what drivers I am using at the moment, and what drivers do I need for running tape backups?"

Linux does not give native support for the HP SureStore DAT24x6 autoloaders. The HP SureStore DAT24x6 autoloaders are supported instead by specific drivers supplied by appropriate commercial Backup Applications. For details, refer to the answer to the question "Why does my device not work correctly with ISV Backup Software, or the Linux in-built backup applet?"

It is clear that, irrespective of the operating system version or tape drive vendor, problems are sometimes experienced when users attempt to set up Linux systems to perform tape backups.

This "UNIX Linux Tape Backup Frequently Asked Questions" document attempts to highlight and resolve issues relative to tape drive backup under the UNIX Linux environment.

It is recommended that you read the whole of this FAQ document rather than just specific questions.

Note - Symbios is now owned by LSI Logic.

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native backup applications

There are a number of tape backup applets written for the Linux operating system.

For details, refer to the answer to the question "How do I use the built-in Tape Backup applet provided by Linux?"

Note - Ultrium high performance tape drives: As a general rule, native backup applications do not provide the required data streaming rate to get the full performance of your Ultrium drive. We recommend using a backup application, which provides better memory management as well as other useful features, such as TapeAlert. HP, Computer Associates, Veritas, Legato and Yosemite all provide suitable products that have been tested with your Ultrium drives. For the latest list of backup packages that support your Ultrium drives, please contact your tape drive or library manufacturer.

first question

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"How do I know what disk drivers I am using at the moment, and what drivers do I need for running tape backups?"

contents of this section

- generic kernels
- compiling a new kernel

related topics

- back to list of questions
- next question

This topic is available in English only

generic kernels

You do not need to worry about which disk drivers you are currently using; providing the right SCSI transport driver is present then it can be used by the tape driver. If you use a generic kernel (that is if you have not trimmed the hardware device support out of the kernel you installed from, say, RedHat 5.2) then it will include support for all popular SCSI HBAs.

Check "http://www.linux.org" about support for your particular hardware – all popular Adaptec 78xx and 77xx chipsets along with Symbios 53cXXX derivatives are currently supported.

compiling a new kernel

If your kernel does not include the relevant SCSI drivers then you should compile a new kernel by downloading the kernel source tarball. Once downloaded, a new kernal can be compiled by following the instructions in your release documentation.

If you installed the kernel sources then they are usually present within the path "/usr/src/linux". This path name can be a symbolic link to the actual release directory (for example "linux-2.0.34").

In order to have SCSI tape support you need to have SCSI support compiled in, and SCSI tape support compiled in.

next question

Go to the next question "How do I configure a tape drive?"

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"How do I configure a tape drive?"

contents of this section

- automatic configuration
- identifying the SCSI tape drive target

related topics

- back to list of questions
- previous question
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automatic configuration

In order to configure a tape for the OS, you need the transport driver, and the tape devices configured appropriately. This will happen automatically assuming they are cabled in correctly and have no SCSI id conflicts.

For details, refer to the answer to the question "How do I know what tape drivers I am using at the moment, and what drivers do I need for running tape backups?"

identifying the SCSI tape drive target

If you wish to check that the drive you have present is seen by the operating system, examine the boot-time output with dmesg. Enter the command:

% dmesg | more

and look for a message like:

st0: …..

which identifies a SCSI tape target. Tapes are numbered sequentially as found by the OS starting at 0.

/dev/stX	Rewinding SCSI tape device X
/dev/nstX	Non-rewinding SCSI tape device X

The no-rewind device is used to create multiple archives on one tape. Normally after running a backup command to the tape device, the tape driver will rewind the media to the start of tape.

The no-rewind device leaves the media positioned just after the filemark written after the end of the previous backup session. This then allow multiples backups on the same piece of media.

next question

Go to the next question "How do I tell if my tape driver and drivers are correctly set up?"

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"How do I tell if my tape drive and drivers are correctly set up?"

contents of this section

- tape drive not recognised
- checking the cables
- checking the tape driver configuration

related topics

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tape drive not recognised

There can be several reasons why a tape drive attached to the system will not respond to commands sent from the application software:

1. Cabling may be too long, too many devices connected, no bus termination, non-shielded internal cables being used for external applications, badly seated connectors, tape drive has same SCSI ID as another device etc.
2. Tape Drive not switched on, or faulty
3. HBA faulty.
4. HBA Driver not loaded, or incorrect driver loaded.
5. Tape Device driver not loaded, or incorrect driver loaded.

In our experience, faulty tape drives and HBAs are unlikely to be the cause of the problem, so all other possibilities should be checked first.

checking the cables

The simplest way to check that the cabling is not at fault is to look for the SCSI Inquiry string of the Tape Drive, which should be displayed by the SCSI HBA BIOS (of the HBA to which the drive is attached) when the system is booting.

If the SCSI Inquiry string of the tape drive is seen at boot time, then it is unlikely that the problem is one of the first three listed above. However, this will not preclude any SCSI errors which arise from marginal cabling, and which generally show up during high-speed synchronous data transfer (when performing backups/restores).

Some systems will not display the SCSI Inquiry strings when booting. However all Adaptec and Symbios SCSI controllers with a BIOS should do this.

checking the tape driver configuration

In order to diagnose whether the tape driver has been configured correctly you should CAREFULLY watch the system boot. The HBA settings are always correct, so if (for example) the Symbios HBA reports that the tape device is present on channel 1 then the tape must have been configured to be on bus 1.

To try to access the tape device and confirm that the tape drive has been configured correctly, type the following command:

% mt –t /dev/nst0 rewind

This should then flash the LEDs on the tape device. If it cannot communicate with the tape device, it will print an error like **"no such device or address"**. Check first that you have media loaded and that the drive is ready (that is, the drive is not still in the process of "coming ready"). If you still cannot get an **mt** command to rewind the media correctly, first check your cabling and then check whether you have a SCSI capable kernel (see the answer to the question "How do I know what disk drivers I am using at the moment, and what drivers do I need for running tape backups?".

next question

Go to the next question "Are there any important points I need to be aware of when changing drivers in my system?"

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"Are there any important points I need to be aware of when changing drivers in my system?"

contents of this section

- generic kernels
- non-generic kernels

related topics

- back to list of questions
- previous question
- next question

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generic kernels

In normal circumstances, you should not have to add drivers into your system. If you add new hardware then the appropriate drivers should be automatically selected unless you are running a non-generic kernel (that is, if you have built your own non-generic kernel in order to trim the device support to a minimum).

non-generic kernels

If you are running a non-generic kernel, you need to download the kernel source code for the release you have installed (or install a package that contains it). Configure the kernel by following the instructions under "/usr/src/linux" and reboot to have an OS that includes the new driver. See the answer to the question "How do I know what tape drivers I am using at the moment, and what drivers do I need for running tape backups?" for further details.

No other configuration should be necessary. However, if you find that have no SCSI tape device files (/dev/[n]st*) then you may need to rerun the command:

/dev/MAKEDEV all

next question

Go to the next question "Why does my device not work correctly with ISV Backup Software, or the Linux in-built backup applet?"

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"Why does my device not work correctly with ISV Backup Software, or the Linux in-built backup applet?"

contents of this section

- standard tape devices
- autochanger devices

related topics

- back to list of questions
- previous question
- next question

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standard tape devices

If you experience problems using a standard tape device under Linux, you should start by troubleshooting your driver configuration – you MUST have SCSI and SCSI tape support built into your kernel.

If you did not see a message at boot time like:

st0: …..

then no SCSI tape drives were found. Review the boot messages using the dmesg command:

% dmesg | more

To reconfigure your kernel see the instructions in "/usr/src/linux" and follow steps like:

% make config

% make depend

% make zImage

move **/zImage** to the usual kernel file location (for example "/")

re-run /sbin/lilo to allow it to boot

reboot your system with the new kernel.

autochanger devices

Note: This only relates to DDS format tape drives. Autoloaders are not available for DLT or Ultrium formats.

By default, Linux does not have any software that will drive an autochanger device (such as the HP SureStore DAT24x6i and the HP SureStore DAT24x6e autochangers). To run a HP SureStore DAT24x6 autoloader within the Linux OS, you either need to purchase an appropriate backup solution, or use a third party changer utility.

An example is **"mtx"** which can be obtained from "ftp://ftp.dandelion.com".

Refer to the third party **"mtx"** utility documentation for full details

Note that the current HP autochanger utility (which is also called **"mtx"**), provided on the HP SureStore DDS CD-ROM, is not currently portable to Linux. A portable version is expected to be released shortly.

next question

Go to the next question "Which HP Surestore tape drives are certified by ISV's and IHV's for use on Linux?"

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"Which hp surestore tape drives are certified by ISV's and IHV's for use on Linux?"

contents of this section

- ISV backup software
- IHV backup software

related topics

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ISV backup software

ISV Backup Software does not tend to use the Microsoft Tape Device drivers, but instead use their own tape drivers. Hewlett-Packard has an ongoing Compatibility testing program to ensure that HP Surestore Tape Drives work with a wide range of HP and 3rd party servers, Operating Systems, SCSI HBAs, and ISV Backup Software.

For a full list of compatible devices and software, consult http://www.hp.com/go/connect.

IHV backup software

IHVs that support the Linux OS are listed under "http://www.linux.org". ISV's may also document their support on their own web sites.

Hardware support is typically via one of a number of methods:

- IHV's will release technical specifications to the developer community to enable them to write drivers.
- IHV's will code drivers and then release these drivers to the Linux community.
- IHV will approve certain standard drivers in the case of non-specific hardware (for example, SCSI tape)

Hewlett-Packard have found that the standard tape driver ("st") is compatible with the HP Surestore DAT and DLT range.

next question

Go to the next question "Why do I get SCSI errors when using my tape device?"

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"Why do I get SCSI errors when using my tape drive?"

contents of this section

- causes of SCSI errors
- upgrading to the latest SCSI transport drivers
- how to obtain upgrades

related topics

- back to list of questions
- previous question
- next question

This topic is available in English only

causes of SCSI errors

There can be many causes of SCSI errors:

1. Cabling can be too long, too many devices connected, no bus termination, non-shielded internal cables being used for external applications, badly seated connectors, tape drive has same SCSI ID as another device etc.
2. SCSI HBA.
3. Tape Drive.
4. HBA Driver.
5. Tape Device Driver.
6. Backup Application.

Of all of the above, cabling and drivers are by far the most likely causes of SCSI errors.

upgrading to the latest SCSI transport drivers

If you are experiencing SCSI errors, then having checked your cabling you should consider upgrading your SCSI transport drivers to use the latest drivers.

Linux drivers are constantly being refined by the driver writers. Hewlett-Packard's experience has shown that the shipping drivers in a given release (for example, RedHat 5.2) tend to be stable. You should certainly expect a "test" release of Linux (odd-numbered kernel source - for example, 2.1.x) to be less stable than a production release (even-numbered kernal source - for example, 2.0.x).

how to obtain upgrades

In order to install a later version of the SCSI drivers, you will need to download the kernel source tree, and have C development tools installed. See "http://www.linux.org" for details.

Note that compiling a new kernel is a complex activity and requires a detailed understanding of the options being chosen. Refer to the documentation present under the file path "/usr/src/linux" which should be a symbolic link to the kernel source tree installed.

However, check out the answer to the question "Are there any important points I need to be aware of when changing drivers in my system?" before altering drivers in your system.

next question

Go to the next question "How do I use the built-in Tape Backup applets provided on Linux?"

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frequently asked questions

"How do I use the built-in Tape Backup applet provided by Linux?"

contents of this section

- tape backup applets
- tar
- Cpio

related topics

- back to list of questions
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This topic is available in English only

tape backup applets

There are a number of tape backup applets written for the Linux OS. The two most usable applications are "tar" which stands for "tape archive", and "cpio" which stands for "CoPy In/Out". These are described below:

Note - Ultrium high performance tape drives: As a general rule, native backup applications (such as tar and cpio) do not provide the required data streaming rate to get the full performance of your Ultrium drive. We recommend using a backup application, which provides better memory management as well as other useful features, such as TapeAlert. HP, Computer Associates, Veritas, Legato and Yosemite all provide suitable products that have been tested with your Ultrium drives. For the latest list of backup packages that support your Ultrium drives, please contact your tape drive or library manufacturer.

tar

Backup

In order to back up a directory tree present under (for example) the /home directory structure, type in the following commands:

% cd /

% tar cvbf 20 /dev/st0 ./home

Note that the different elements of the above command signify the following:

- "c" means create
- "v" means verbose (remove if you want quiet)
- "b" means buffer the output
- "f" specifies the tape archive (in this case, a peripheral tape)
- "/dev/st0" goes with the "f" argument to specify the tape (/dev/st0 = rewinding SCSI Tape 0)
- "20" goes with the "b" option to transfer data in 20*512 byte chunks
- "./home" specifies the directory structure to be backed up

Tar will backup the contents of /home to the first tape device in the system and then rewind the tape device after the job is completed. If you wish to perform multiple backups onto one piece of media you would need to use the device name:

/dev/nst0 (no-rewind SCSI Tape 0)

Note that you should always use "./" in your paths, as the built-in versions of tar supplied by many UNIX vendors will not strip off the absolute path. This then means that on restore it will write over your original copy of the backed up files. Using the relative path ("." means relative to the current working directory) prevents this and enables restores to be done to some other path of the filesystem.

Restore

In order to restore an archive, type in the following commands:

% cd [someplace to restore]

% tar xvbf 20 /dev/st0

Note that the different elements of the above command signify the following:

- "x" means extract
- "v" means verbose (remove if you want quiet)
- "b" means buffer the output
- "f" specifies the tape archive (in this case, a peripheral tape)
- "/dev/st0" goes with the "f" argument to specify the tape (/dev/st0 = rewinding SCSI Tape 0)
- "20" goes with the "b" option to transfer data in 20*512 byte chunks

Testing

In order to read the data back, but not actually restore it (to test that it is readable), you need to use the command:

% tar tvbf 20 /dev/st0

where "t" is for table of contents.

cpio

Backup

In order to back up a directory tree present under (for example) the /home directory structure, type in the following commands:

% cd /

% find ./home -print | cpio -ocB > /dev/st0

Cpio expects a list of files to be backed up on its standard input stream. The command reads as follows:

find me all the files under the directory home in the current working directory and print them, then feed the output of that into a command to copy the output OUT (-o) with character headers for portability ('c') and transfer data in 5Kb chunks ('B'). Send the output of all of this to the first rewinding tape device (> /dev/st0).

Cpio will backup the contents of /home to the first tape device in the system and then rewind the tape device after the job is completed. If you wish to perform multiple backups onto one piece of media you would need to use the device name:

/dev/nst0 (no-rewind Scsi Tape 0)

Note that you should always use "./" in your paths, as the built-in versions ofcpio supplied by many UNIX vendors will not strip off the absolute path. This then means that on restore it will write over your original copy of the backed up files. Using the relative path ("." means relative to the current working directory) prevents this and enables restores to be done to some other path of the file system.

Restore

In order to restore an archive, type in the following commands:

% cd [someplace to restore]

% cpio -icB < /dev/st0

Note that the restore command is very similar to the backup command; the "i" specifies that the information is being transfered "In" from the tape device (< /dev/st0).

Testing

In order to read the data back, but not actually restore it (to test that it is readable), you need to use the command:

% cpio -itcB < /dev/st0

where "t" is for table of contents.

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"How do I know what disk drivers I am using at the moment, and what drivers do I need for running tape backups?"

contents of this section

- the host bus adaptor chipset
- the symbios logic host adaptor

related topics

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This topic is available in English only

the host bus adapter chipset

First, you need to determine which adaptor your tape is going to be installed upon. Secondly, determine which adaptor your disks are installed upon. If you are running a SCSI system and wish to install SCO, you have to have the root disk on SCSI ID 0.

The host bus adaptor chipset determines which drivers are used to talk to SCSI peripherals, as shown in the following table:

Adaptec	78xx chipset	alad driver
Adaptec	77xx chipset	arad driver
Symbios	53cxx chipset	slha driver

the symbios logic host adaptor

Note that in order to install onto a Symbios adaptor you will need to install the symha driver package. This is referred to in this document as the slha (Symbios Logic Host Adaptor) driver.

next question

Go to the next question "How do I configure a tape drive?"

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"How do I configure a tape drive?"

contents of this section

- configuring a tape device
- configuring a SCSI tape driver
- choosing the device

related topics

- back to list of questions
- previous question
- next question

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configuring a tape device

In order to configure a tape for the OS, you need the transport driver, and the tape devices configured appropriately. You can configure the tape devices by running the following commands as root (do not type the "%", that is the command line prompt):

% mkdev tape

For details of the transport driver, refer to the answer to the question "How do I know what tape drivers I am using at the moment, and what drivers do I need for running tape backups?"

configuring the SCSI tape driver

To add a driver you should select the option "Configure a SCSI tape drive". If you inadvertantly add a device or misconfigure a device, you should NOT abort the configuration process with Ctrl-C. Instead, follow the dialogue through to the nearest point that it will allow you to quit with "q". (Aborting with Ctrl-C can result in systems files being corrupted.)

After selecting "Configure SCSI tape" you should then select "Install tape drive". (Note that the remove option is also present here.)

You will then be asked which host adaptor the tape is on. Pick either "alad", "arad" or "slha" as appropriate.

You are then asked which bus is the drive on. This actually means which SCSI channel is the drive on. If you have a dual channel bus and it is on the second channel then the bus number is 1. Otherwise if it is a single bus system or is on the first channel, answer 0.

Next, input the SCSI target id as per the device's setting.

Select the LUN to be 0.

Enter "y" to update the SCSI configuration.

The next set of questions have the same answer irrespective of tape:

Vendor identification string	leave this blank (hit return)
SCSI version to which the device complies	2 (for SCSI 2)
Response Data Format	2 (for SCSI-2)

choosing the device

The choice of device is now determined by the type of peripheral. For a DLT device, choose the "Generic" type; for a DAT device, choose "DAT" (option number 4).

Enter "q" to leave the boot string displayed when the system boots unchanged.

Enter "q" to return to the main menu.

Enter "q" to quit.

You are now prompted to rebuild the kernel and kernel environment (which includes the device files). Perform both steps by answering "y" when prompted, and select the new kernel to be booted by default.

You should now reboot the system and test the configured tape device.

next question

Go to the next question "How do I tell if my tape driver and drivers are correctly set up?"

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"How do I tell if my tape drive and drivers are correctly set up?"

contents of this section

- tape drive not recognised
- checking the cables
- checking the tape driver configuration

related topics

- back to list of questions
- previous question
- next question

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tape drive not recognised

There can be several reasons why a tape drive attached to the system will not respond to commands sent from the application software:

1. Cabling may be too long, too many devices connected, no bus termination, non-shielded internal cables being used for external applications, badly seated connectors, tape drive has same SCSI ID as another device etc.
2. Tape Drive not switched on, or faulty
3. HBA faulty.
4. HBA Driver not loaded, or incorrect driver loaded.
5. Tape Device driver not loaded, or incorrect driver loaded.

In our experience, faulty tape drives and HBAs are unlikely to be the cause of the problem, so all other possibilities should be checked first.

checking the cables

The simplest way to check that the cabling is not at fault is to look for the SCSI Inquiry string of the Tape Drive, which should be displayed by the SCSI HBA BIOS (of the HBA to which the drive is attached) when the system is booting.

If the SCSI Inquiry string of the tape drive is seen at boot time, then it is unlikely that the problem is one of the first three listed above. However, this will not preclude any SCSI errors which arise from marginal cabling, and which generally show up during high-speed synchronous data transfer (when performing backups/restores).

Some systems will not display the SCSI Inquiry strings when booting. However all Adaptec and Symbios SCSI controllers with a BIOS should do this.

checking the tape driver configuration

When FIRST accessing the tape device only, you can check whether the tape driver has been configured correctly by typing the following command:

% tape rewind

This should then print out a line of information on the console which displays the Vendor and Product in a similar manner to that shown below:

Stp0:	**Vendor=HP**	**Product=C1537A**

If you do not see the information printed, check that you have a tape loaded into the drive and then retry. If you do have a tape loaded and an error like **"no such device or -- address"** is displayed, then you probably have a misconfigured tape driver. Rerun **"mkdev tape"** and remove the configured drive and then re-add it.

If the tape driver is loaded then you should also be able to eject the media, re-insert it and rerun the tape rewind command. This should flash the LEDs on all DAT drives (but not DLT drives).

next question

Go to the next question "Are there any important points I need to be aware of when changing drivers in my system?"

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"Are there any important points I need to be aware of when changing drivers in my system?"

contents of this section

- multiple instances of the same adaptor
- noting the bios information

related topics

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This topic is available in English only

multiple instances of the same adaptor

You need to be especially careful about having multiple instances of the same adaptor present in the system. For example, if you have an onboard Adaptec 78xx chipset and then add a 2940UW PCI card then the OS will number the onboard chipset at adaptor number 0 and the PCI card at number 1. This holds for given families, so for example, if you had the previous configuration and added in a Symbios PCI board, it would then, by slha, instance 0 (as there are no other Symbios boards present already).

noting the bios information

The easiest way to clarify the configuration is to reboot the system a couple of times so that you can note down the BIOS information as it is printed out.

next question

Go to the next question "Why does my device not work correctly with ISV Backup Software, or the SCO in-built backup applet?"

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"Why does my device not work correctly with ISV Backup Software, or the SCO in-built backup applet?"

contents of this section

- standard tape devices
- autochanger devices

related topics

- back to list of questions
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standard tape devices

In order to configure ArcServe/Open with a normal tape device, you will have to edit the file **"/etc/conf/pack.d/chey/Space.c"** and change the **"cheycfg[]"** array to reflect your adaptor configuration.

Refer to the application software documentation for full details.

autochanger devices

Note: This only relates to DDS format tape drives. Autoloaders are not available for DLT or Ultrium formats.

By default, SCO does not have any software that will drive an autochanger device (such as the HP SureStore DAT24x6i and the HP SureStore DAT24x6e autoloaders). To run a HP SureStore DAT24x6 autoloader within the SCO OS, you can use the "mtx" utility supplied by Hewlett-Packard on the HP SureStore CD-ROM under the /Unix directory.

To use "mtx", point it at a tape device and then tell it which tapes you wish to load or unload.

For example:

mtx -d /dev/xStp0 -s

will report back which slots have tape media loaded.

mtx -d /dev/xStp0 -l 1

will load the tape in magazine slot 1.

mtx -d /dev/xStp0 -u 2

will unload the currently loaded tape into slot 2 of the magazine.

Note that "mtx" needs to be pointed at the **"xStp0"** device. This is a pass-through device file which is used to send raw SCSI commands to the peripheral (in this case vendor unique enhanced load/unload commands).

In order to configure an autochanger for ArcServe/Open, you MUST buy the full retail version. The bundled ArcServe/Open does NOT support autochangers or libraries.

next question

Go to the next question "Which HP Surestore tape drives are certified by SCO, ISV's and IHV's for use on OpenServer?"

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"Which HP Surestore tape drives are certified by SCO, ISV's and IHV's for use on OpenServer?"

contents of this section

- obtaining information
- SCO certification

related topics

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obtaining information

In order to find which drives are certified by SCO, refer to "http://wdb1.sco.com/chwp/owa/hch_search".

Select the tape drive vendor as "Hewlett-Packard" and the search category as "tape drives".

If problems are experienced with this link, start at "http://www.sco.com" and follow the Support and Hardware Compatibility links.

SCO certification

SCO perform official certification of tape drives for all of their OS releases.

ISVs will qualify their software to support tape drive devices under a given OS release version.

next question

Go to the next question "Why do I get SCSI errors when using my tape device?"

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"Why do I get SCSI errors when using my tape drive?"

contents of this section

- causes of SCSI errors
- upgrading to the latest SCSI transport drivers
- changing drivers

related topics

- back to list of questions
- previous question
- next question

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causes of SCSI errors

There can be many causes of SCSI errors:

1. Cabling can be too long, too many devices connected, no bus termination, non-shielded internal cables being used for external applications, badly seated connectors, tape drive has same SCSI ID as another device etc.
2. SCSI HBA.
3. Tape Drive.
4. HBA Driver.
5. Tape Device Driver.
6. Backup Application.

Of all of the above, cabling and drivers are by far the most likely causes of SCSI errors.

upgrading to the latest SCSI transport drivers

If you are experiencing SCSI errors, then having checked your cabling you should consider upgrading your SCSI transport drivers to use the latest drivers ("alad" / "arad" / "slha").

In at least one case (SCO OpenServer 5.0.0 release), it has been found that the SCSI HBA vendor had a better functioning driver than the one shipped with SCO. However, as of SCO OpenServe 5.0.4, the drivers included with OpenServer are believed to be "good".

Drivers are constantly being refined by manufacturers. Hewlett-Packard's experience has shown that using the latest versions of drivers (especially HBA drivers) can solve many of the SCSI problems that can occur.

changing drivers

Check out the answer to the question "Are there any important points I need to be aware of when changing drivers in my system?" before altering drivers in your system.

next question

Go to the next question "How do I use the built-in Tape Backup applets provided by SCO?"

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frequently asked questions

"How do I use the built-in Tape Backup applet provided by SCO?"

contents of this section

- tape backup applets
- tar
- Cpio

related topics

- back to list of questions
- previous question

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tape backup applets

There are a number of tape backup applets written for the SCO OS. The two most usable applications are "tar" which stands for "tape archive", and "cpio" which stands for "CoPy In/Out". These are described below:

Note - Ultrium high performance tape drives: As a general rule, native backup applications (such as tar and cpio) do not provide the required data streaming rate to get the full performance of your Ultrium drive. We recommend using a backup application, which provides better memory management as well as other useful features, such as TapeAlert. HP, Computer Associates, Veritas, Legato and Yosemite all provide suitable products that have been tested with your Ultrium drives. For the latest list of backup packages that support your Ultrium drives, please contact your tape drive or library manufacturer.

tar

Backup

In order to back up a directory tree present under (for example) the /home directory structure, type in the following commands:

% cd /

% tar cvbf 20 /dev/rStp0 ./home

Note that the different elements of the above command signify the following:

- "c" means create
- "v" means verbose (remove if you want quiet)
- "b" means buffer the output
- "f" specifies the tape archive (in this case, a peripheral tape)
- "/dev/rStp0" goes with the "f" argument to specify the tape (/dev/rStp0 = rewinding SCSI Tape 0)
- "20" goes with the "b" option to transfer data in 20*512 byte chunks
- "./home" specifies the directory structure to be backed up

Tar will backup the contents of /home to the first tape device in the system and then rewind the tape device after the job is completed. If you wish to perform multiple backups onto one piece of media you would need to use the device name:

/dev/nrStp0 (no-rewind SCSI TaPe 0)

Note that you should always use "./" in your paths, as the built-in versions of tar supplied by many UNIX vendors will not strip off the absolute path. This then means that on restore it will write over your original copy of the backed up files. Using the relative path ("." means relative to the current working directory) prevents this and enables restores to be done to some other path of the file system.

Restore

In order to restore an archive, type in the following commands:

% cd [someplace to restore]

% tar xvbf 20 /dev/rStp0

Note that the different elements of the above command signify the following:

- "x" means extract
- "v" means verbose (remove if you want quiet)
- "b" means buffer the output
- "f" specifies the tape archive (in this case, a peripheral tape)
- "/dev/rStp0" goes with the "f" argument to specify the tape (/dev/rStp0 = rewinding SCSI Tape 0)
- "20" goes with the "b" option to transfer data in 20*512 byte chunks

Testing

In order to read the data back, but not actually restore it (to test that it is readable), you need to use the command:

% tar tvbf 20 /dev/rStp0

where "t" is for table of contents.

cpio

Backup

In order to back up a directory tree present under (for example) the /home directory structure, type in the following commands:

% cd /

% find ./home -print | cpio -ocB > /dev/rStp0

Cpio expects a list of files to be backed up on its standard input stream. The command reads as follows:

find me all the files under the directory home in the current working directory and print them, then feed the output of that into a command to copy the output OUT (-o) with character headers for portability ('c') and transfer data in 5Kb chunks ('B'). Send the output of all of this to the first rewinding tape device (> /dev/rStp).

Cpio will backup the contents of /home to the first tape device in the system and then rewind the tape device after the job is completed. If you wish to perform multiple backups onto one piece of media you would need to use the device name:

/dev/nrStp0 (no-rewind Scsi Tape 0)

Note that you should always use "./" in your paths, as the built-in versions ofcpio supplied by many UNIX vendors will not strip off the absolute path. This then means that on restore it will write over your original copy of the backed up files. Using the relative path ("." means relative to the current working directory) prevents this and enables restores to be done to some other path of the filesystem.

Restore

In order to restore an archive, type in the following commands:

% cd [someplace to restore]

% cpio -icB < /dev/rStp0

Note that the restore command is very similar to the backup command; the "i" specifies that the information is being transfered "In" from the tape device (< /dev/st0).

Testing

In order to read the data back, but not actually restore it (to test that it is readable), you need to use the command:

% cpio -itcB < /dev/rStp0

where "t" is for table of contents.

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"What is the difference between NWPA and the old DDFS ".dsk" architecture, and which architecture is supported by which versions of NetWare?"

contents of this section

- novell's policy on new systems
- rationale
- the layered driver approach
- tape class drivers
- NWPA minimum recommended patch level
- dynamic loading / unloading of drivers

related topics

- back to list of questions
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This topic is available in English only

novell's policy on new systems

As of Jan 1st 1999, Novell's policy is to only certify new systems if they are compliant with the NWPA driver architecture (that is, SCSI controller drivers with the ".ham" file extension, and tape and ASPI drivers with the ".cdm" file extension).

The NWPA driver architecture can be used with NetWare 3.12 / 4.11, (providing the appropriate patches have been loaded - see http://support.novell.com/misc/patlst.htm) and with NetWare 3.2 / 4.2 and 5.x.

The NWPA driver architecture replaces the DDFS monolithic ".dsk" driver architecture used with NetWare 3.x and NetWare 4.x. The DDFS driver architecture is not supported by NetWare 5.x.

rationale

Novell introduced NWPA with NetWare 4.x, as an alternative to the DDFS driver architecture (which originated as a way of controlling disk drives - hence the driver extension ".dsk"). It enabled NetWare to easily and dynamically support a wide range of peripheral devices - something not so easily achieved with the "monolithic" DDFS architecture.

the layered driver approach

NWPA has been designed from the ground-up to dynamically support many different devices. It uses a layered driver structure, as used in many other operating systems. This allows different abstractions of devices to be used at various layers in the driver stack.

For example, for SCSI tape drives, at the lowest level would be (one or more) SCSI Host Bus Adapter (HBA) driver(s). These drivers have the extension ".ham" (standing for host adapter module). On top of these would be layered (one or more) Tape Drive driver(s). These drivers have the extension ".cdm" (standing for custom device module - in this case, a tape class driver).

tape class drivers

Tape Class drivers are mainly used by Novell's own backup applications - SBackup for NetWare 3.x / 4.x) and SBCON for NetWare 5.x. As with the DDFS architecture, Independent Software Vendor (ISV) backup applications tend to use the ASPI (Advanced SCSI Programming Interface) layer to communicate with tape drives. Therefore, when using backup applications such as BackupExec and ArcServeIT, the relevant ASPI layer driver must be loaded in place of the normal tape driver. See the answer to the question "How do I know what drivers (DDFS or NWPA) I am using at the moment, and what drivers I need for running tape backups?" for further details.

Further services can be layered on top of the class driver modules, such as NetWare 5's Storage Management Services. This is used by NetWare 5's built-in backup application "SBCON", and by many other backup applications, to provide media management abstraction. (Refer to the "SBCON Quick Reference Guide" for full details of Novell's SBCON backup application.)

NWPA minimum recommended patch level

The main component of NWPA is the NetWare Loadable Module "NWPA.NLM". If your system has this module loaded, then it should support NWPA. For NetWare versions up to 3.12, additional patches will be required before you can upgrade to run NWPA. If you are using NetWare 3.x and 4.x you are advised to upgrade your system to the patch level recommended by Novell's "Minimum Patch List" at http://support.novell.com/misc/patlst.htm.

The minimum recommended NWPA patch level for NW3.1x, 3.2 and 4.1x is NWPA_UP.EXE, which can be found at the following location: http://developer.novell.com/devres/sas/certinfo.htm.

For NW3.12 the NWPA_UP.EXE patch should be uncompressed in the SERVER.312 directory. This also contains patch 312PTD.exe, which should be uncompressed and applied following the instructions given in the accompanying 312PTD.txt file.

For NW3.2 all that needs to be done is to uncompress NWPA_UP.EXE in the SERVER.312 directory

Note : NetWare 4.1x Support Pack 7, 4.2 and 5.x do not require this patch.

dynamic loading / unloading of drivers

NWPA supports dynamic loading/unloading of drivers, and will auto-load certain drivers if it recognises supported devices. For example, once an HBA ".ham" driver is loaded, if an operational tape drive is found on the SCSI bus that is supported by the SCSI2TP.CDM (NetWare 3 / NetWare 4) or NWTAPE.CDM (NetWare 4.2 and 5) tape device drivers, NWPA should auto-load the tape device driver.

next question

Go to the next question "How do I know what drivers (DDFS or NWPA) I am using at the moment, and what drivers I need for running tape backups?"

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"How do I know what drivers (DDFS or NWPA) I am using at the moment, and what drivers I need for running tape backups?"

contents of this section

- checking the drivers - netware 3.x / 4.x
- checking the drivers - netware 5.x
- checking your startup and autoexec files
- typical DDFS drivers used for tape drives
- NWPA drivers used for tape drives

related topics

- back to list of questions
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This topic is available in English only

checking the drivers - netware 3.x / 4.x

In order to check that the correct HBA and Tape Device (or ASPI) drivers are loaded, type the following at the console prompt:

"LIST MODULES"

Check that the drivers listed on the screen display correspond with those listed below:

DDFS Drivers

NWPA Drivers

With NetWare 3.x and 4.x, the "Install" utility can also be used to view installed device drivers, by typing:

"LOAD INSTALL"

checking the drivers - netware 5.x

In order to check that the correct HBA and Tape Device (or ASPI) drivers are loaded, type the following at the console prompt:

"MODULES"

Check that the drivers listed on the screen display correspond with those listed below:

DDFS Drivers

NWPA Drivers

With NetWare 5.x, the "nwconfig" utility can also be used to view installed device drivers, by typing:

"NWCONFIG"

checking your startup and autoexec files

It is possible to check which drivers are being loaded by the NetWare startup.ncf and autoexec.ncf files by examining them using INSTALL.NLM (NetWare 3.x / 4.x) or NWCONFIG.NLM (NetWare 5.x). These can be loaded at the console prompt.

Consult your NetWare manual for full details on how to use these utilities.

typical DDFS drivers used for tape drives

The following tables list typical DDFS drivers used for tape drives on NetWare 3.x / 4.x systems:

HBA drivers	(.dsk file extensions)
AIC7870.DSK	NetWare 3.x/4.x Adaptec AIC78XX chipset driver (inc. 2940UW)
SDMSNET3.DSK	NetWare 3.x Symbios driver (inc. 53C895 chipset)
SDMSNET4.DSK	NetWare 4.x Symbios driver (inc. 53C895 chipset)

ASPI drivers	used by ISV Backup Apps (BackupExec, ArcServelT etc.)
ASPITRAN.DSK	NetWare 3.x/4.x ASPI driver for AIC7870.DSK
NETASPI3.DSK	NetWare 3.x ASPI driver for SDMSNET3.DSK
NETASPI4.DSK	NetWare 4.x ASPI driver for SDMSNET4.DSK

Tape drivers	used by Novell Backup App - SBackup
TAPEDAI.DSK	NetWare 3.x/4.x Tape Device Driver

NWPA drivers used for tape drives

The following tables list NWPA drivers used for tape drives on NetWare 3.x / 4.x / 5.x systems:

HBA drivers	(.ham file extensions)
AHA2940.HAM	Adaptec AIC7880/AHA2940UW driver
AIC78U2.HAM	Adaptec Ultra2 LVDS SCSI chipset driver
SYM8XXNW.HAM	Symbios driver (inc. 53C895 chipset)
SYMHINW.HAM	Symbios driver (53C896 chipset)

ASPI drivers	used by ISV Backup Apps (BackupExec, ArcServelT etc.)
NWASPI.CDM	Generic NWPA ASPI driver

Tape drivers	used by Novell Backup Apps - Sbackup (NW3.x/4.x) and SBCON (NW5.x)
SCSI2TP.CDM	NetWare 3.x/4.1x NWPA Tape Device driver
NWTAPE.CDM	NetWare 4.2/5.x NWPA Tape Device driver
DLTTAPE.CDM	SureStore DLT Tape Driver (used if DLT drive not supported by NWTAPE.cdm

next question

Go to the next question "How do I tell if my tape drive and drivers are correctly set up?"

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"How do I tell if my tape drive and drivers are correctly set up?"

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- tape drive not recognised
- checking the cables
- checking the HBA driver
- how to get further information

related topics

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This topic is available in English only

tape drive not recognised

There can be several reasons why a tape drive attached to the system is not recognised by backup software:

1. Cabling may be too long, too many devices connected, no bus termination, non-shielded internal cables being used for external applications, badly seated connectors, tape drive has same SCSI ID as another device, illegal bus configuration etc.
2. Tape Drive not switched on, or faulty.
3. HBA faulty.
4. HBA Driver not loaded, or incorrect driver loaded.
5. Tape Device driver or ASPI driver not loaded, or incorrect driver loaded.
6. Tape Device driver or Backup Application does not support tape drive. HP SureStore DAT and DLT drives have wide tape device driver and backup application connectivity - see the answer to the question "Which HP SureStore tape drives are certified by Novell, ISVs and IHVs for use on NetWare." for full details.

In general, faulty tape drives and HBAs are rarely the cause of the problem, so all other possibilities should be checked first.

checking the cables

The simplest way to check that the cabling is not at fault is to look for the SCSI Inquiry string of the Tape Drive, which should be displayed by the SCSI HBA BIOS (of the HBA to which the drive is attached) when the system is booting.

If the SCSI Inquiry string of the tape drive is seen at boot time, then it is unlikely that the problem is one of the first three listed above. However, this will not preclude any SCSI errors which arise from marginal cabling, and which generally show up during high-speed synchronous data transfer (when performing backups/restores). If the problem relates to an LVDS (Ultra 2 Wide - 68 pin) device sharing the SCSI bus with SE narrow (50 pin) devices, users must ensure that either the LVDS device is placed first on the bus, or the appropriate pass-through cables are used.

Some systems will not display the SCSI Inquiry strings when booting. However all Adaptec and Symbios SCSI controllers with a BIOS should do this.

checking the HBA driver

In order to check that the HBA and Tape Drive drivers are installed and working correctly, access a screen listing of the devices attached to the system by entering the following commands at the console prompt:

"SCAN FOR NEW DEVICES"

"LIST DEVICES"

If a list does not appear then the HBA driver is the likely cause of problems. However, if the HBA header appears (possibly with a list of other devices connected on the same bus), but the tape drive Inquiry String is not shown (remember there should be 2 LUNs shown for an Autoloader), then it is likely that the tape driver is not loaded correctly.

Note that the command **"SCAN FOR NEW DEVICES"** can be used to force NetWare to find tape drives you have added to the system after NetWare has started up, or if you have just loaded a new HBA driver.

how to get further information

Consult the answer to the question "How do I know what drivers (DDFS or NWPA) I am using at the moment, and what drivers I need for running tape backups" to find out how to check that the correct HBA driver and Tape Device Driver (or ASPI driver) are loaded.

In order to check that the Backup Application supports the tape drive, check with the ISV, or go to http://www.hp.com/go/connect.

next question

Go to the next question "Are there any important points I need to be aware of when changing drivers in my system"?"

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"Are there any important points I need to be aware of when changing drivers in my system?"

contents of this section

- standard drivers
- deciding to change drivers
- possible impact on other parts of the system

related topics

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standard drivers

Major server manufacturers usually qualify their systems with specific versions of drivers, which are then included on any installation CDs they provide with their systems. For example, the HP NetServer Navigator CD included with each HP NetServer contains HBA and Network Card drivers for the various operating systems supported. These are then included in any OS installation performed by the automatic OS Installation Assistant provided on the NetServer Navigator CD.

deciding to change drivers

Before altering drivers, you should be aware that doing so can effectively introduce untested drivers into your systems. However, drivers - especially HBA drivers - are constantly being refined. Using a later version of a driver should not introduce any new reliability problems, and can often improve any existing reliability problems you may have on your systems. The general advice however, is that drivers should only be altered if problems are actually being experienced.

possible impact on other parts of the system

If you are experiencing SCSI errors when using your backup software, you need to consider the possible impact on the other parts of the system before you decide to change the HBA drivers.

For example, upgrading the driver for the SCSI controller connected to the tape drive will not alter the driver controlling the disk subsystem in the following cases:

1. Where the system hard disks are controlled by a Symbios SCSI controller and driver, and where the tape drive is connected to an Adaptec 2940UW.

2. Where the system hard disks are controlled by a HP NetRAID controller and driver, and where the tape drive is connected to a Symbios controller.

Upgrading the driver for the SCSI controller connected to the tape drive will also alter the driver controlling the disk subsystem, in the following cases:

1. Where the system hard disks are controlled by a Symbios SCSI controller and driver, and where the tape drive is connected to a Symbios SCSI controller.

2. Where the system hard disks are controlled by an Adaptec 7880 controller and driver, and where the tape drive is connected to an Adaptec 2940UW.

next question

Go to the next question "Why does my autoloader not work correctly with ISV Backup Software, or the NetWare in-built backup applet?"

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frequently asked questions

"Why does my autoloader not work correctly with ISV Backup Software, or the NetWare in-built backup applet?"

contents of this section

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- the adaptec AIC7880 chipset
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  - startup.ncf
  - autoexec.ncf
- known issues with NWPA multi-LUN support
- how to get further information

related topics

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Note: This question only relates to DDS format tape drives. Autoloaders are not available for DLT or Ultrium formats.

making command-line changes

NWPA ".ham" drivers do not by default search for LUNs (Logical Unit Numbers) other than LUN0 on SCSI Targets. Therefore in order to successfully use HP SureStore Autoloaders (such as the DAT40x6, which use both LUN0 and 1) a command-line switch must be set when loading the driver, and a command issued to force the system to scan all LUNs. This involves altering/adding lines in the startup.ncf and autoexec.ncf files.

Click on the links below for instructions on how to achieve this with the Adaptec AIC7880 chipset (found on the AHA 2940UW and most older HP NetServers), the Symbios SYM53c895 chipset (found on HP NetServers LPr, LH3 and LH4), or the Symbios SYM53c896 chipset (found on HP NetServer LXr8000 and LXr8500).

The Adaptec AIC7880 chipset

The Symbios SYM53c895 and SYM53c896 chipsets

The startup files can be edited using the aforementioned INSTALL (NW 3.x / 4.x) and NWCONFIG (NW 5.x) utilities. For any changes to take effect, the server should be restarted. In all cases, the user must ensure that changes are made to the correct lines in the startup.ncf file. Often there will be more that one line referencing an HBA driver - changes to enable LUN scanning must be made to the driver of the HBA to which the Tape Device is connected. The Slot Number should help users identify which line refers to the appropriate HBA. Making changes to the other HBA driver references will not cause the system to fail, but may cause system boot and SCSI bus scan times to be increased.

the adaptec AIC7880 chipset

The Adaptec AIC7880/AHA2940UW driver is called AHA2940.HAM. You need to alter the startup.ncf and autoexec.ncf files as follows.

startup.ncf

Find the line that references the driver, and modify it using the examples below as a guide:

To scan all LUNs on all targets use the lun_enable option:

"LOAD AHA2940.HAM slot=(slot no of hba) lun_enable=ff"

To scan LUNs 0 and 1 on all targets use the lun_enable option:

"LOAD AHA2940.HAM slot=(slot no of hba) lun_enable=03"

To scan LUNs 0 and 1 on target 2 use the multlun_targets option:

"LOAD AHA2940.HAM slot=(slot no of hba) lun_enable=03 multlun_targets=04"

Bit Mask Options
Use the example given here to aid calculating the hexadecimal values for bit mask options. In this example, **lun_enable=05** enables scanning for LUNs 0 and 2 on all targets. The same scheme is used to calculate values for multi-lun_targets.

	Bit Position																
LUN ID	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
0, 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Converted binery to hex:	0				0				0				5				= 05h

autoexec.ncf

Add the following to the end of autoexec.ncf:

"SCAN ALL LUNS"

Other .ham drivers exist for different Adaptec chipsets, in particular AIC78U2.HAM for Adaptec LVDS Ultra2 SCSI controller.

the symbios SYM53c895 and SYM53c896 chipsets

The Symbios SYM53c895 driver is called SYM8XXNW.HAM. The Symbios SYM53c896 driver is called SYMHINW.HAM. You need to alter the startup.ncf and autoexec.ncf files as follows.

startup.ncf

Find the line that references the driver, and modify it using the examples below as a guide:

To scan all LUNs on all targets use the /LUN option:

"LOAD (driver name) slot=(slot no of hba) /LUN"

Or, to limit the scan to certain Targets/LUNs use the SCAN option:

"LOAD (driver name) slot=(slot no of hba) SCAN = ID[LUN Range]"

For example, "SCAN = 3[0-1]" would scan LUNs 0 through 1 on Target ID 3.

autoexec.ncf

Add the following to the end of autoexec.ncf:

"SCAN ALL LUNS"

known issues with NWPA multi-LUN support

There are currently still a few minor issues with multiple LUN support in NWPA. Adaptec and Symbios are working with Novell to address these issues.

In particular, the scanning of all LUNs on all targets can take some time, and often leads to other problems. It is therefore not recommended. Instead, the user should limit LUN scanning to LUNs 0 and 1 (the two LUNs used in the Autoloader), and limit multi-lun scanning to the SCSI Target ID of the Tape Drive.

how to get further information

Additional information can be found in the downloadable driver kits from www.adaptec.com and www.lsilogic.com:

http://www.adaptec.com/support/overview/scsiha.html

http://www.lsilogic.com

next question

Go to the next question "Why does my ISV Backup Software not give me the option to specify that I am using ".ham" drivers when I install it?"

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"Why does my ISV Backup Software not give me the option to specify that I am using ".ham" drivers when I install it?"

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- backup software and NWPA drivers
- if changes are necessary
- known issues with .ham driver support of ISV backup software
- instructions for installing BackupExec with NWPA
- instructions for installing ArcServe or ArcServeIT with NWPA

related topics

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backup software and NWPA drivers

When installing the ISV software, there may not be an option for NWPA drivers when you are asked to select the SCSI Host Bus Adapter (HBA) type. For example, Backup Exec (up to version 8.0) and ArcServe/ArcServeIT (up to version 6.6) do not give this option.

However, the majority of backup software on NetWare (not including the Novell-supplied backup applets Sbackup and SBCON), access the tape drive using the SCSI ASPI layer, which is provided by the NWPA ASPI driver "nwaspi.cdm". This ASPI driver uses the services provided by the SCSI HBA ".ham" driver. So, as long as the ".ham" driver and "nwaspi.cdm" are loaded, ISV Backup Software can be used with NWPA.

if changes are necessary

If the ".ham" and ASPI driver are not already loaded by default, add the lines as described below into your startup.ncf file to load the relevant ".ham" and NWPA ASPI driver "nwaspi.cdm".

For example, for the Symbios 53c895 driver:

Type **"LOAD SYM8XXNW.HAM slot=2 SCAN = 3[0-1]"** to load the Symbios driver for HBA in slot 2, and SCAN for LUNs 0 and 1 on SCSI Target ID 3.

Then type **"LOAD NWASPI.CDM"** to load the NWPA ASPI driver.

or, for the Adaptec AIC7880 driver:

Type **"LOAD AHA2940.HAM slot=3 lun_enable=03 multlun_targets=08"** to load the Adaptec driver for HBA in slot 3 and scan for LUNs 0 and 1 on SCSI Target ID 3.

Then type **"LOAD NWASPI.CDM"** to load the NWPA ASPI driver.

Reboot the server after making these changes.

Remember that the LUN options given above are only required if using an Autoloader. They can introduce a significant overhead to the initialisation time of the driver, so only use them if necessary. If using an Autoloader, you should also add **"SCAN ALL LUNS"** to the end of the autoexec.ncf file.

This method works with most ISV backup software, including BackupExec and ArcServe. It is recommended that you use the latest versions of ISV Backup Software.

known issues with .ham driver support of ISV backup software

You should take note of the following:

1. A known and major issue is that NWPA does not guarantee consistent enumeration of SCSI HBAs from one boot to the next. Therefore if more than one SCSI controller is used to attach tape drives, and NWPA reorders the HBA enumeration, ArcServe may not bind correctly to the controller/tape drive. This is a known problem that CA are actively working on. A workaround is to use only one SCSI HBA to attach tape drives.
2. It is strongly recommended that the latest versions of ISV Backup Software, including latest Service Pack/Patches are used.

At the time of writing, for latest version of Veritas Backup Exec is 7.5 for NetWare 3.x, and version 8.0 for NetWare 4.x / 5.x.

The latest version of CA ArcServeIT for NetWare is v6.6, for which Service Pack 1 is now available. This patch can be downloaded from http://support.cai.com/Download/patches/asitnwee.html

ArcServe v.6.1 users should use Service Pack 2, and additional patch files as advised by CA. Information can be found at http://support.cai.com/Download/patches/asnw.html

instructions for installing BackupExec with NWPA

During the installation of BackupExec from a windows client, you will reach a screen saying: **"Select the type of controller installed in the destination server"**.

Proceed as follows:

1. Select the option **"other ASPI compatible"**.
2. Continue with the installation but before you start Backup Exec on the server (using **"load bestart"**), load either **"sym8xxnw.ham"** (Symbios SYM53C895 chipset), **"aha2940.ham"** (for Adaptec AIC7880 chipset), or **"aic78u2.ham"** (for Adaptec Ultra2 SCSI chipset).
3. If not already loaded by startup.ncf, load **"nwaspi.cdm"**.

IMPORTANT: a DDFS ".dsk" driver for the SCSI chipset must not also be loaded

Performing a backup operation using Backup Exec v8, after installing Service Pack 2 for NetWare 5, might result in the following error: "There are currently no partitions defined which can service this job. Partitions are defined to support certain operations, users, and media format. Please contact your system administrator for assistance." This error is caused by the installation program for the Support Pack not updating the file, SMDR.NLM, correctly.

Novell have rectified this problem in the latest release of Support Pack 2 for NetWare 5, which can be downloaded from their support web site. Alternatively, using the original version of the Support Pack, the problem can be rectified in the following way. Run BESTOP to stop Backup Exec, and change the attributes of SMDR.NLM (found in SYS:/SYSTEM) so that it can be written to. Now overwrite the file with that from the service pack (found in directory ..\NW5SP2\PRODUCTS\SYSSYSTEM) and re-start your server. Further details can be found on Seagate Software's web site, at: http://seer.nsmg.seagatesoftware.com/tnotes/benware/020~101476.htm

instructions for installing ArcServe or ArcServeIT with NWPA

During installation of ArcServe from a windows client, you will reach a screen saying: **"Adapter Board Configuration on Server...."**

Proceed as follows:

1. Select the option **"shared and/or ASPI"**

On the next screen:

1. Select **"Board 0"**, and for the supported adapter select either **"SYMBIOS LOGIC ASPI SCSI"** if using a Symbios SCSI controller, or **"Adaptec AHA-2940 (ASPI)"** if using an Adaptec AIC7880 chipset (also found in the AHA2940UW). In actual fact, the selection here is arbitrary - it just appears to be used to decide what to display in the message below :
2. Ignore the message saying: **"Important : you must load the following drivers before running ArcServe: sdmsnetX.dsk and netaspiX.nlm ; X=netware version"** (for Symbios), or **"Important : you must load the following drivers before running ArcServe : aic7870.dsk and aspitran.dsk"** (for Adaptec). This message is ArcServe assuming you are using a .dsk driver, whereas in fact you are using a ".ham" driver.

On the next screen:

1. Select host number **0**.
2. Continue with the installation, but before starting ArcServe on the server (using **"load astart6"**), you must load either **"sym8xxnw.ham"** (Symbios SYM53C895 chipset), **"aha2940.ham"** (for Adaptec AIC7880 chipset), or **"aic78u2.ham"** (for Adaptec Ultra2 SCSI chipset).
3. If not already loaded by startup.ncf, load **"nwaspi.cdm"**.
4. If using an autoloader, install the **Changer Option**.

IMPORTANT: a DDFS ".dsk" driver for the SCSI chipset must not also be loaded.

next question

Go to the next question "Why do I get SCSI errors when using my tape drive?"

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"Why do I get SCSI errors when using my tape drive?"

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- upgrading to the latest NWPA devices
- how to obtain upgrades

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causes of SCSI errors

There can be many causes of SCSI errors:

1. Cabling can be too long, too many devices connected, no bus termination, non-shielded internal cables being used for external applications, badly seated connectors, tape drive has same SCSI ID as another device, illegal bus configurations etc.
2. SCSI HBA.
3. Tape Drive.
4. HBA Driver.
5. Tape Device Driver.
6. Backup Application.

Of all of the above, cabling and drivers are by far the most likely causes of SCSI errors.

upgrading to the latest NWPA devices

If you are experiencing SCSI errors, then having checked your cabling you should consider upgrading your NetWare device drivers to use the latest NWPA drivers. This also applies if you are using ".dsk" drivers, although especially for NetWare 3.x, this can require a significant amount of system re-configuration.

Drivers are constantly being refined by manufacturers, and compatibility testing on HP SureStore tape drives has shown that using the latest versions of drivers (especially HBA drivers) can solve many of the SCSI problems that arise.

However, check out the answer to the question "Are there any important points I need to be aware of when changing drivers in my system?" before altering drivers in your system.

how to obtain upgrades

HBA ".ham" drivers should be available from the HBA vendor:

They can be downloaded from www.adaptec.com
(see http://www.adaptec.com/support/overview/scsiha.html)
and www.lsilogic.com
(see http://www.lsilogic.com).

Some chipset ".ham" drivers may not be available on HBA manufacturer websites. For example, Adaptec only include NWPA drivers for their Ultra 2 SCSI chipsets. Novell has a comprehensive list of drivers in the "3rdparty" subdirectory of the following patch. We recommend using the "3rdparty" drivers in this patch, (or later drivers if available from HBA manufacturer websites or your server vendor) if you are experiencing SCSI timeouts with either ".ham" drivers or ".dsk" drivers. The patch is called NWPAIT1 and is available at the following location:
ftp://ftp.novell.com/pub/netwire/nsd/nwpait1.exe.

IMPORTANT. The minimum recommended NWPA patch level for NW3.1x, 3.2 and 4.1x is NWPA_UP.EXE, which can be found at the following location:
http://developer.novell.com/devres/sas/certinfo.htm.

For NW3.12 the NWPA_UP.EXE patch should be uncompressed in the SERVER.312 directory. This also contains patch 312PTD.exe, which should be uncompressed and applied following the instructions given in the accompanying 312PTD.txt file.

For NW3.2 all that needs to be done is to uncompress NWPA_UP.EXE in the SERVER.312 directory

Note : NetWare 4.1x Support Pack 7, 4.2 and 5.x do not require this patch.

next question

Go to the next question "Which HP SureStore tape drives are certified by Novell, ISVs and IHVs for use on NetWare?"

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"Which HP Surestore tape drives are certified by Novell, ISVs and IHVs for use on NetWare?"

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novell certification

Certification of Tape Devices with NetWare means that the Tape Device has been tested using Novell's certification test suite, and is supported by Novell for use with Sbackup (NetWare 3.x / 4.x) or SBCON (NetWare 5.x).

Although your SureStore Tape Drive might not be marked as being Certified by Novell, the device will still operate fully with Sbackup/SBCON and a wide range of ISV Software. HP works very closely with Novell to ensure that all current HP SureStore Tape Drives are supported by the native tape drivers. If support is not offered by the driver that came with your NetWare installation or Service Pack, newer drivers will be provided on HP's support web site and on the HP SureStore Tape CD-ROM provided with your Tape Drive. HP also carries out extensive in-house compatibility testing, and no problems have been found using HP SureStore DAT and DLT tape drives with Sbackup and SBCON.

However, Novell will only officially support Tape Drives for use with Sbackup and SBCON if they have been certified. HP is actively working to ensure that all HP SureStore DAT and DLT tape drives are certified by Novell.

The current Novell NetWare Tape Device certification status for HP SureStore Tape Devices is given below:

NetWare Version	**NW 3.xx**	**NW 3.xx**	**NW 4.xx**	**NW 4.xx**	**NW 5.xx**
Driver	**DSK Driver TAPEDAI.DSK (See Note 1)**	**NWPA Driver SCSI2TP.CDM (See Note 1)**	**DSK Driver TAPEDAI.DSK (See Note 1)**	**NWPA Driver SCSI2TP.CDM (NWTAPE.CDM for NW4.2)**	**NWPA Driver NWTAPE.CDM**
DAT24	Certified	See Note 1	Certified	Certified	To be Certified
DAT24x6	See Note 2	See Note 2	See Note 2	See Note 2	To be Certified
DAT40	See Note 1	See Note 1	See Note 1	To be Certified	To be Certified
DAT40x6	See Note 2	See Note 2	See Note 2	See Note 2	To be Certified
DLT 80	See Note 1	See Note 1	See Note 1	To Be Certified	To be Certified
DLTVS 80					
Ultrium 230					
Ultrium 215					

Notes:

1. No further qualifications planned.
2. Neither NetWare 3.x or 4.x provides native autoloader support in SBackup.

ISV backup software

ISV Backup Software does not generally use the Novell Tape Device drivers, but instead uses the ASPI layer and appropriate drivers. Hewlett-Packard has an ongoing compatibility testing program to ensure that HP SureStore Tape Drives work with a wide range of HP and 3rd party servers, Operating Systems, SCSI HBAs, and ISV Backup Software.

For a full list of compatible devices and software, consult http://www.hp.com/go/connect.

supported devices lists

HVs (SCSI HBA vendors) and ISVs (backup software vendors) maintain their own supported devices lists. Hewlett-Packard is actively working with major IHVs and ISVs to ensure that HP SureStore Tape Drives are included in their compatibility testing and are included on their supported devices lists.

next question

Go to the next question "How do I use the built-in Tape Backup applets provided by Novell?"

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"How do I use the built-in Tape Backup applets provided by Novell?"

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tape backup applets

There are two built-in Tape Backup applets provided by Novell.

Sbackup

The first applet is Sbackup, provided with NetWare 3.x / 4.x. It is a console-based utility that provides the functionality required to backup from and restore to a NetWare server running an appropriate TSA (Target Service Agent). It does not offer DDS Autoloader support.

For full details of Sbackup, consult the Sbackup (NetWare 3.x / 4.x) Quick Reference Guide.

SBCON

The other applet is SBCON, provided with NetWare 5.x. SBCON is also console-based, but has a partner application called "NWBACK32" that can be used to administer backups / restores through a windows-based interface on a remote client. SBCON supports DDS Autoloaders.

For full details of SBCON, consult the SBCON (NetWare 5.x) Quick Reference Guide.

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SBackup (NetWare 3.x / 4.x) quick reference guide

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introduction

SBackup is a built-in backup application provided by Novell with NetWare 3.x / 4.x.

SBackup supports scheduling, backing up of remote NetWare servers, and allows full / differential / incremental backup strategies & monitoring of "jobs". It does not support DDS Autoloaders.

This page describes how to use SBackup with both DDFS and NWPA drivers.

using SBackup

It is assumed that you have a general knowledge of how to set up and administer a NetWare 3.x / 4.x system. For more details on how to use all the features of SBackup, consult your NetWare manual.

Context-sensitive help in SBackup can also be obtained by pressing the F1 function key.

running SBackup

In order to run SBackup, the system must be set up as follows:

For NWPA, ensure the following minimum NWPA patch level:

1. Ensure all required NWPA drivers are installed on the system. The minimum recommended NWPA patch level for NW3.1x, 3.2 and 4.1x is NWPA_UP.EXE, which can be found at: http://developer.novell.com/devres/sas/certinfo.htm.

   For NW3.12 the NWPA_UP.EXE patch should be uncompressed in the SERVER.312 directory. This also contains patch 312PTD.exe, which should be uncompressed and applied following the instructions given in the accompanying 312PTD.txt file.

   For NW3.2 all that needs to be done is to uncompress NWPA_UP.EXE in the SERVER.312 directory.

   Note : NetWare 4.1x Support Pack 7, 4.2 and 5.x do not require this patch.

   Novell includes a comprehensive set of HBA ".ham" drivers in the NWPAIT1 patch, found in the "3rdparty" subdirectory. We recommend using the "3rdparty" drivers in this patch, (or later drivers if available from HBA manufacturer websites or your server vendor) if you are experiencing SCSI timeouts with either ".ham" drivers or ".dsk" drivers. The patch is available at: ftp://ftp.novell.com/pub/netwire/nsd/nwpait1.exe.>

2. For NetWare 3.x, the DIBIMM Media Manager driver must also be installed on the system. DIBIMM is the NWPA counterpart to the "DAI driver (.dsk)" based DIBIDAI.NLM. This uses an updated configuration file called DIBI2$DV.DAT in SYS:SYSTEM\DIBI\ (as described in Tape.doc in the NWPA_UP patch, and Nwpait1.txt in the NWPAIT1 patch described above).

Load SCSI HBA and Tape Device drivers:

1. The SCSI HBA should already be installed, with tape drive attached.

2. For a .DSK installation, the SCSI HBA ".dsk" driver should be loaded. This is usually done automatically by adding a line to the NetWare startup.ncf file as follows:

   Symbios driver for NetWare 3.x

   LOAD SDMSNET3.DSK

   Symbios driver for NetWare 4.x

   LOAD SDMSNET4.DSK

   Adaptec AIC78XX (inc. AHA2940UW) driver for NetWare 3.x/4.x

   LOAD AIC7870.DSK

   Adaptec Ultra2 SCSI chipset driver for NetWare 3.x / 4.x

   LOAD AIC78U2.DSK

The ".dsk" tape device driver, must then be loaded:

LOAD TAPEDAI.DSK

3. For an NWPA installation, the SCSI HBA ".ham" driver should be loaded. This is usually done automatically by adding a line to the NetWare startup.ncf file.

Symbios 53C895 driver for NetWare 3.x / 4.x

LOAD SYM8XXNW.HAM

Adaptec 2940UW driver for NetWare 3.x / 4.x

LOAD AHA2940.HAM

The NetWare 3.x / 4.x NWPA tape device driver, SCSI2TP.CDM (NWTAPE.cdm for NW4.2), should then be automatically loaded by NWPA when the ".ham" driver is loaded, providing the tape drive connected to the SCSI HBA is supported by SCSI2TP.CDM / NWTAPE.cdm. If for any reason the driver is not loaded, you can try manually loading the driver, by adding a line to the NetWare startup.ncf file:

LOAD SCSI2TP.CDM (or LOAD NWTAPE.CDM for NW4.2)

Load the Backup Engine components of SBackup:

1. **TSAxxx.NLM** loaded, where xxx = '312 or 410' for file systems on the particular NetWare version.

Load the Runtime Utility components of SBackup:

1. **SBackup.NLM** loaded. This is the NetWare Backup applet.

performing a backup

Performing a backup using SBackup varies between NetWare 3.x and NetWare 4.x as described below:

netware 3.x

To perform a backup under NetWare 3.x, work through the following steps:

1. After SBackup loads, enter a suitable (supervisor) username and password. SBackup will present you with a list of DIBI drivers.

2. If ".dsk" is being used, select the DIBI-2 DAI driver option. A list of tape devices that are controlled by .DSK drivers should appear. Select the relevant tape device.

   HP Surestore Tape Devices are denoted in the following Product Name / Device name table:

Product Name	Device Name
HP Surestore DAT24	HP-1537A
HP Surestore DAT24x6	HP-1557A
HP Surestore DAT40	HP-5683A
HP Surestore DAT40x6	HP-5713A

3. If NWPA is being used, select the DIBI2MM driver option. A list of Media Manager tape devices that are controlled by NWPA drivers should appear. Select the relevant tape device. You will be asked if you wish to change the block size.

   Normally, this block size can be left at the default value. After selecting **"No"** or choosing a new block size, SBACKUP's main menu should appear. From this point, the behavior of SBACKUP should be the same as with other DIBI drivers.

4. In order to perform a backup, select "Select Target to Backup/Restore" at the main menu. This will give a list of all machines running a TSA. Select the required target. Enter a suitable (supervisor) username and password for that machine.

5. Select the Backup Menu, and choose "Backup Selected Target (which refers to the server specified earlier).

6. At the Backup Options screen, enter the parameters for the backup. The "What To Back Up" field is used to select the directories/files to back up. Pressing **[Ins]** will bring up a list of directories/files.

   Move through the file system until the directory / file that you wish to backup is reached. Pressing **[Esc]** will cause the selection to appear in the list. Use the "Session Description" field to enter a brief description for the backup, if required.

7. Press **[Esc]** to submit the job. Select **"Yes"** at the "Proceed With Backup" prompt.

8. You can select to start the backup job now, or schedule it for later.

9. You may now enter a label for the tape, if required.

10. Finally, you must confirm that a tape is inserted in the drive.

Once the job is started, job details can be displayed.

netware 4.x

To perform a backup under NetWare 4.x, work through the following steps:

1. Once SBackup is running, select "Storage Device Administration" and then select the relevant tape drive to use. Pressing [Ins] will allow you to select utilities to delete tape header, erase etc.

   HP Surestore DAT Tape Devices are denoted in the following Product Name / Device name table:

Product Name	Device Name
HP Surestore DAT24	HP-1537A
HP Surestore DAT24x6	HP-1557A
HP Surestore DAT40	HP-5683A
HP Surestore DAT40x6	HP-5713A

2. To perform a backup, select "Change Target to Backup from or Restore to" at the main menu. This will give a list of all machines running a TSA. Select the required target. Enter a suitable (admin) username and password for that machine.

3. Select "Backup" from the main menu. You will be given a choice of "full, differential, incremental, custom". "Custom" can be used to select certain files/directories - once selected, the directories/files to back up are specified by selecting the " What do you want to backup" option.

   Pressing [Ins] will display a list of directories/files. Move through the file system until the directory / file you want to backup is reached. Pressing [Esc] will cause the selection to appear in the list.

4. Note that in NetWare 4.11, SBackup allows you the option to verify a backup, which will verify that the data was correctly written to tape.

5. To submit the job, press the function key F10.

6. You can select to start the backup job now, or schedule it for later.

7. You may now enter a label for the tape, if required.

Once the job is started, job details can be displayed.

performing a restore

Performing a restore is much the same as a performing a backup, using the restore options in SBackup rather than the backup options. You can select which files to restore, and where you wish to restore them to (this does not necessarily have to be the same location from where they were backed up).

known issues

Setting up SBackup to work with NWPA on NetWare 3.x is a challenge. If trouble is experienced, it is recommended that you consider using ".dsk" drivers and "tapedai.dsk" (you will need to select 'dibidai' instead of 'dibimm' when running SBackup).

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SBCON (NetWare 5.x) quick reference guide

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- performing a restore
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introduction

SBCON is a built-in backup application provided by Novell with NetWare 5.x. It uses the backup / restore facilities provided by SMS (Storage Management Services), which must be installed on the system either during the installation of NetWare 5, or later through "nwconfig" or "ConsoleOne". Using SMS, backup/restores can be done of file systems on both the local host, and on a remote system. File systems supported are:

- NetWare File System
- NetWare DOS Partition
- NDS Database
- Windows 95, Windows 98 & Windows NT workstation file systems
- GroupWise Databases

SBCON supports DDS Autoloaders and scheduling, and allows for full / differential / incremental backup strategies and mid-flow monitoring of "jobs". NetWare 5.x only supports NWPA drivers.

using SBCON

It is assumed that you have a general knowledge of how to set up and administer a NetWare 5 system.

For more details on how to use all the features of SBCON, you should consult your NetWare manual.

running SBCON

In order to run SBCON, the system must be set up as follows:

Load SCSI HBA and Tape Device drivers:

Note - the SCSI HBA should already be installed, with tape drive attached.

1. Load the SCSI HBA ".ham" driver. This is usually done through "nwconfig", but can be achieved manually by adding a line to the NetWare startup.ncf file:

   Symbios 53C895 driver for NW3.x/4.x/5.x

   LOAD SYM8XXNW.HAM

   Adaptec AIC78XX (inc. AHA2940UW) driver for NetWare 3.x / 4.x / 5.x

   LOAD AHA2940.HAM

   Adaptec Ultra2 SCSI chipset driver for NetWare 3.x / 4.x / 5.x

   LOAD AIC78U2.HAM

   Note that by default ".ham" drivers do not scan any LUNs other than LUN0. If using an Autoloader, which has a LUN0 and LUN1, the drivers will need to be loaded with options to scan LUN0 and 1 on the SCSI ID of the Autoloader.

   For example, to load the Symbios 53C895 driver for HBA in slot 2, and SCAN for LUNs 0 and 1 on SCSI Target ID 3, add:

   LOAD SYM8XXNW.HAM slot=2 SCAN = 3[0-1]

   Or, to load the Adaptec driver for HBA in slot 3 and scan for LUNS 0 and 1 on SCSI Target ID 3, add:

   LOAD AHA2940.HAM slot=3 lun_enable=03 multlun_targets=08

   To actually scan the LUNs, the following command should be used, or preferably be added to the end of the AUTOEXEC.NCF file:

   SCAN ALL LUNS

   Remember to reboot the server for these changes to take effect.

The NetWare 5.x NWPA tape device driver, NWTAPE.CDM, should then be automatically loaded by NWPA when the ".ham" driver is loaded, if the tape drive connected to the SCSI HBA is supported by NWTAPE.CDM. Older versions of NWTAPE.cdm do not support all of the latest HP SureStore DLT Tape Drives. However, the latest version of this driver (found on Service Pack 2) supports the entire range of HP SureStore DAT and DLT drives. Alternatively, for HP SureStore DLT support, users can use the DLTTAPE.cdm driver provided.

2. If for any reason the driver is not loaded, you can try manually loading the driver by adding a line to the NetWare startup.ncf file, as follows:

   LOAD NWTAPE.CDM

Load the Backup Engine Components of SBCON

Proceed as follows:

1. Type the following command where *xxx* = "312", "410" or "500" for file systems on NetWare servers; *xxx* = "proxy" for workstation backup; or *xxx* = "NDS" for NDS backups (and likewise for other data types).

   Load TSAxxx.NLM

   When loading the TSA for the first time, you will be asked for the context in which an SMDR (Storage Management Data Requester) group container and the SMDR itself should be created. Generally you should put these two in the same context (but you do not have to). You will also be asked for details of a user with admin rights over the context given.

   If not already loaded, the SMDR.NLM module will be loaded automatically by **TSAxxx.NLM.**

2. **SME.NLM**, the NetWare Storage Management Engine will be loaded and unloaded automatically by SBCON as required for a backup / restore operation.

Load the Runtime Utility Component of SBCON

Proceed as follows:

1. Type the command:

   Load QMAN.NLM

   This is the SMS Queue Manager. When loading QMAN for the first time, you will be asked to specify the context and name of the SMS Job Queue to be created (this actually creates a printer queue object in NDS which the backup engine can poll for scheduled jobs).

   If not already loaded, **SMSDI.NLM**, the SMS Storage Device Interface will be loaded automatically by QMAN.NLM.

2. Type the command:

   Load SBSC.NLM

   This is the Communications Module.

3. Type the command:

   Load SBCON.NLM

   This is the NetWare Storage Management Console

Load Optional Components

Proceed as follows:

1. Load the NWadmin32 component of ZEN Works (installed at a client). This allows you to view the print queues and other objects created in the NDS tree. (Alternatively, use ConsoleOne at the server.)

performing a backup

In order to perform a backup, the system must be set up as follows:

1. Once SBCON is running, select "Storage Device Administration" and ensure that the tape drive is present and the media recognised. Pressing **[Ins]** accesses the utilities function and can be used to delete the tape header, erase etc.

   HP Surestore Tape Devices are denoted in the following Product Name / Device name table:

Product Name	**Device Name**
HP Surestore DAT24	HP-1537A
HP Surestore DAT24x6	HP-1557A
HP Surestore DAT40	HP-5683A
HP Surestore DAT40x6	HP-5713A

2. Select "Target Service". This will give a list of all machines running a TSA. The required target should be selected, and a suitable (e.g. admin) username and password supplied for that machine. In order to perform a backup, select "Job Admin" then "Backup" at the main menu.

3. Select the tape drive and media required from the "Device / Media" option.

4. Next, specify the directories/files to be backed up by selecting the "Select What To Backup" option. You should move through the file system until the directory / file required is reached. Pressing **[Esc]** will cause the selection to appear in the list.

5. Press **[Esc]** a second time to submit the job.

Job details can be viewed in the "current job list". When shown as running, backup activity can be viewed by pressing **[Ins]**.

performing a restore

Performing a restore is much the same as a performing a backup, using the restore options in SBCON rather than the backup options.

administering remote backups / restores

Rather than use the SBCON interface, backups / restores can also be administered at a remote client using the application "NWBACK32.exe" (found in the SYS:\PUBLIC directory). NWBACK32 requires the same modules to be loaded on the server as when using SBCON.

When NWBACK32 is run for the first time, you will be presented with the SMDR Configuration Window. The name of the tree should be selected, followed by the "typeful" fully distinguished name of the container for both SMDR context and SMDR Group context fields. Ensure that "Use SAP for Name Resolution" box is checked. Shut down and restart NWBACK32 for these changes to take effect.

On this and all subsequent invocations of the application, you will be presented with a "Quick Access" menu. Select "Device Administration", then under the "file" menu tab, select "Change Context" and change this (if necessary) to the location of the SMDR group context.

Once in the correct context, selecting "Job Administration" on the quick access menu will display details of devices and backup queues contained within the given context. Move down to the specific tape media user to re-label / format / erase etc.

To perform a backup, click "file" then "New Session", then "Backup". In the left pane, click "What to backup", and select the appropriate server. Once authenticated, select the files / directories to backup. In the right pane, select "Where to backup", then the context, "Queues" and finally the specific backup queue. At this point the job should be submitted. Then select the type of backup (full etc), select any subsets to backup, configure any filtering required and then setup scheduling and re-run intervals. The final step is to name and submit the job.

As in SBCON, the job list can be viewed through the "current job list" menu item. Once the job is running, press **[Ins]** to view its progress.

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"How do tape drivers work within a Windows NT environment?"

contents of this section

- the layered driver approach
- points to note

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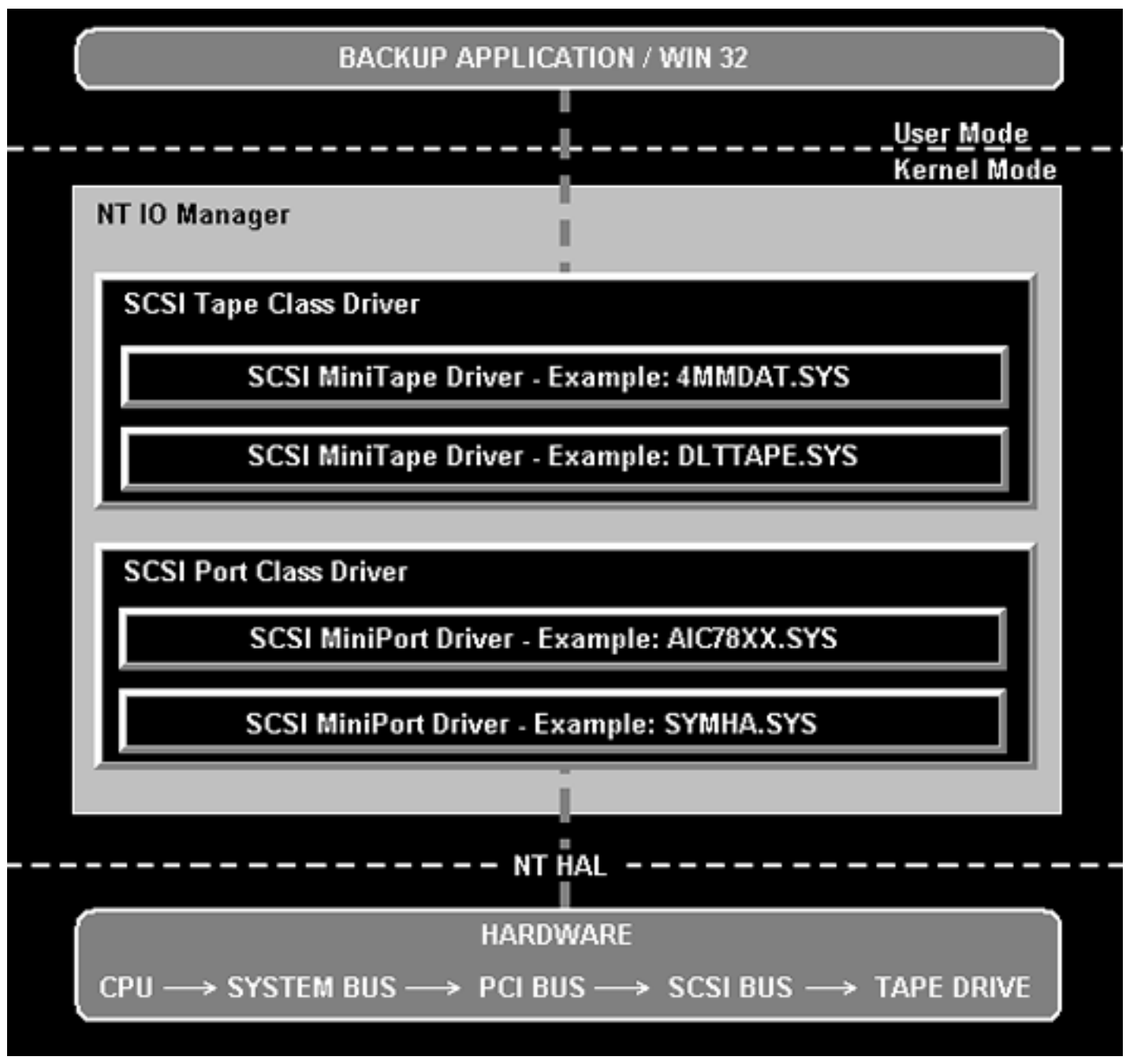
the layered driver approach

Windows NT uses a layered driver architecture. This allows multiple SCSI Host Bus Adapters (HBA) to be transparently used with multiple tape drives. The general structure of how a Backup Application communicates with a physical tape drive is shown below in a very simplified, diagrammatic format.


BACKUP APPLICATION / WIN 32
User Mode
Kernel Mode
NT IO Manager
SCSI Tape Class Driver
SCSI MiniTape Driver - Example: 4MMDAT.SYS
SCSI MiniTape Driver - Example: DLTTAPE.SYS
SCSI Port Class Driver
SCSI MiniPort Driver - Example: AIC78XX.SYS
SCSI MiniPort Driver - Example: SYMHA.SYS
NT HAL
HARDWARE
CPU → SYSTEM BUS → PCI BUS → SCSI BUS → TAPE DRIVE

points to note

The main points to note are:

1. Windows NT tape drivers are effectively "plug-ins" to a generic tape class driver.
2. Windows NT SCSI HBA drivers are effectively "plug-ins" to a generic SCSI class driver.
3. Multiple tape drivers and SCSI HBA drivers can be plugged in at the same time.
4. The class drivers provide the "environment" within which the plug-ins operate. The class driver does most of the work that is common to the tape drives and the HBA's (for example, read/write etc), and uses the plug-in to provide device-specific processing (for example, reading/modifying particular tape drive-specific settings)
5. This environment (known in programming terms as an "API") can change slightly from one version of NT to another. (Although the environment is "usually" backwards compatible, there is no guarantee of this). For this reason, you should always use the tape drivers made for the version of Windows NT that you are running.
6. A tape driver is required for each general type of tape drive, for example: a DAT tape driver, a DLT tape driver, an Ultrium tape driver etc. The driver will only load and operate if it recognises the SCSI Inquiry string of one or more tape drives connected to the system.

next question

Go to the next question "How do I know what drivers I am using at the moment, and what drivers do I need for running tape backups?"

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"How do I know what drivers I am using at the moment, and what drivers do I need for running tape backups?"

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checking and adding SCSI adapter drivers under windows NT 3.51

Once a SCSI HBA is attached to the system and providing you have the required administrator access rights, a list of the currently loaded SCSI adapter drivers can be viewed, or a new SCSI driver added, as follows:

1. In the Windows Main program group, double-click on the Windows NT Setup icon.
2. At the Options menu, select "Add/Remove SCSI Adapters". A list of currently loaded SCSI Adapter drivers will be displayed.
3. If you wish to load an additional driver, click on the "Add" button in the "SCSI Adapter Setup" dialog box.
4. From the "Select SCSI Adapter Option" dialog box, select the required SCSI driver from the device list. Note that the last option in the list is to use a driver from a manufacturer-supplied disk.
5. Click on the "Install" button.

checking and adding SCSI adapter drivers under windows NT 4.0

Once a SCSI HBA is attached to the system and providing you have the required administrator access rights, a list of the currently loaded SCSI adapter drivers can be viewed, or a new SCSI driver added, as follows:

1. Click on the Start button. Select "Settings" and then "Control Panel".
2. Double-click on the SCSI Adapters icon. A list of currently loaded SCSI Adapter drivers will be displayed.
3. If you wish to load an additional driver, click on the "Drivers" tab, then click on "Add" to install the driver.
4. Select the required SCSI driver from the device list. Note that in order to use a driver from a manufacturer-supplied disk, you need to select the "Have Disk" button.
5. Insert the Windows NT Server CD-ROM (or manufacturer-supplied floppy disk) and click on OK.
6. Enter the path name for the driver, using the correct letter for your CD-ROM drive (or your floppy drive if using a floppy disk). This can be obtained using the Browse feature. Click OK.

checking and adding tape drivers under windows NT 3.51

Once a tape drive is attached to the system and providing you have the required administrator access rights, a list of the currently loaded tape drivers can be viewed, or a new tape driver added, as follows:

1. In the Windows Main program group, double-click on the Windows NT Setup icon.
2. At the Options menu, select "Add/Remove Tape Devices". A list of currently loaded Tape Device drivers will be displayed.
3. If you wish to remove the current driver, click on the "Remove" button in the "Tape Device Setup" dialog box.
4. If you wish to load an addition driver, click on the "Add" button in the "Tape Device Setup" dialog box.
5. From the "Select Tape Device Option" dialog box, select the required tape driver from the device list. Note that in order to use a driver from a manufacturer-supplied disk.
6. Click on the "Install" button.

checking and adding tape drivers under windows NT 4.0

Once a tape drive is attached to the system and providing you have the required administrator access rights, a list of the currently loaded tape drivers can be viewed, or a new tape driver added, as follows:

1. Click on the Start button. Select "Settings" and then "Control Panel".
2. Double-click on the Tape Devices icon. A list of currently loaded Tape Device drivers will be displayed.
3. The system will scan for attached tape drives, and will display a message for the new SCSI device. If you wish to load an addition driver for this device, click on "OK".
4. If a driver is not immediately found for the device, select the required SCSI driver from the device list. Note that in order to use a driver from a manufacturer-supplied disk, you need to select the "Have Disk" button.
5. Insert the Windows NT Server CD-ROM (or the HP Surestore CD-ROM or manufacturer-supplied floppy disk) and click on OK.
6. Enter the path name for the driver, using the correct letter for your CD-ROM drive (or your floppy drive if using a floppy disk). This can be obtained using the Browse feature. Click OK.

drivers required by windows NTBackup

Microsoft's built-in backup application, NTBackup, makes use of the standard Windows NT driver architecture. This is described in the answer to the question "How do tape drivers work within the Windows NT environment?"

Before a tape drive can be used to back up with NTBackup, the tape driver for that tape drive must be loaded.

The following table shows the different drivers that need to be loaded when using NTBackup:

HBA Drivers	Driver Type
AIC78XX.SYS	Adaptec AIC78XX (including AHA2940UW) driver
AIC78U2.SYS	Adaptec Ultra2 SCSI (including AHA2940U2W) driver
SYMC8XX.SYS	Symbios 53C895 single-channel Ultra2 SCSI driver
SYM_HI.SYS	Symbios 53C896 dual-channel Ultra2 SCSI driver

tape drives supported by windows NT tape drivers

The following table shows the different tape drives that are supported by standard Windows NT tape drivers:

Tape Drive	Driver	Windows NT3.51 SP5	Windows NT4.0 SP4
DAT8	hpdat.sys	Supported (see Note 1)	Supported (see Note 1)
DAT24	hpdat.sys	Supported (see Note 1)	Supported (see Note 1)
DAT24x6	Supported (see Note 1 & 2)	Supported (see Note 1 & 2)	Supported (see Note 1 & 2)
DAT40	hpdat.sys	Supported (see Note 1)	Supported (see Note 1)
DAT40x6	hpdat.sys	Supported (see Note 1 & 2)	Supported (see Note 1 & 2)
DLT80	dlttape.sys	Supported (see Note 1)	Supported (see Note 1)
DLT VS80	bnchtape.sys	not applicable	Supported (see Note 1)
Ultrium 230	not applicable	not applicable	not applicable
Ultrium 215	not applicable	not applicable	not applicable

Notes:

1. The driver is available on the HP Surestore CD-ROM.
2. Support in manually operated mode (robotics controlled through front panel)

drivers required by ISV backup applications

Most ISV Backup Applications do not use the Windows NT supplied Tape Device drivers. Instead, many ISV Backup Applications will supply their own ("MiniTape") tape drivers, which plug into the standard Microsoft driver architecture. An example is Backup Exec. (See the answer to the question "How do tape drivers work under the Windows NT environment?" for details of the standard Microsoft driver architecture).

Other ISV Backup Applications use their own tape drivers, in place of the NT SCSI Tape Class Driver. Examples are ArcServe and ArcServeIT.

Note, however that the standard Windows NT HBA driver architecture is always retained.

Whichever method is used, ISV Backup Applications will generally either automatically load the required tape drivers (for example ArcServe / ArcServeIT), or prompt you on how to do so (for example BackupExec).

If tape drivers are not automatically loaded, or you are not prompted, then if the ISV has supplied drivers, they are generally kept in a \i386 or \drivers directory on the ISV CD.

next question

Go to the next question "How do I tell if my tape drive and drivers are correctly set up?"

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"How do I tell if my tape drive and drivers are correctly set up?"

contents of this section

- tape drive not recognised
- checking the cables
- checking the HBA driver
- how to get further information

related topics

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tape drive not recognised

There can be several reasons why a tape drive attached to the system is not recognised by backup software:

1. Cabling may be too long, too many devices connected, no bus termination, non-shielded internal cables being used for external applications, badly seated connectors, tape drive has same SCSI ID as another device etc.
2. Tape Drive not switched on, or faulty.
3. HBA faulty.
4. HBA Driver not loaded, or incorrect driver loaded.
5. Tape Device driver or ASPI driver not loaded, or incorrect driver loaded.
6. Tape Device driver does not support tape drive. HP SureStore DAT and DLT drives have wide tape device driver connectivity - see the answer to the question "What HP SureStore DAT and DLT tape drives are certified by Microsoft, ISV's and IHV's for use on Windows NT?" for full details.
7. Backup Application does not support tape drive - HP SureStore DAT and DLT drives have wide backup application connectivity - see the answer to the question "What HP SureStore DAT and DLT tape drives are certified by Microsoft, ISV's and IHV's for use on Windows NT?" for full details.

In our experience, faulty tape drives and HBAs are unlikely to be the cause of the problem, so all other possibilities should be checked first.

checking the cables

The simplest way to check that the cabling is not at fault is to look for the SCSI Inquiry string of the Tape Drive, which should be displayed by the SCSI HBA BIOS (of the HBA to which the drive is attached) when the system is booting.

If the SCSI Inquiry string of the tape drive is seen at boot time, then it is unlikely that the problem is one of the first three listed above. However, this will not preclude any SCSI errors which arise from marginal cabling, and which generally show up during high-speed synchronous data transfer (when performing backups/restores).

Some systems will not display the SCSI Inquiry strings when booting. However all Adaptec and Symbios SCSI controllers with a BIOS should do this.

checking the HBA driver

In order to check that HBA and Tape drivers are working correctly, use the method described in the answer to the question "How do I know what drivers I am using at the moment, and what drivers do I need for running tape backups?". Note, however, that this method cannot be used for tape drivers for applications, such as ArcServe, which do not use the standard Windows NT Tape Driver architecture.

In the Windows NT 4.0 Tape Devices applet, if the tape driver is displayed, but not shown as loaded, then it is likely that the driver does not support the device. See the answer to the question "How do I know what drivers I am using at the moment, and what drivers do I need for running tape backups?" for which tape drives are supported by Windows NT out-of-the-box. If using ISV Backup Software, consult the particular Backup Software's documentation to find out which tape drives are supported by the ISV's drivers.

how to get further information

In order to check that the Backup Application supports the tape drive, check with the ISV, or check "http://www.hp.com/go/connect".

next question

Go to the next question "Are there any important points I need to be aware of when changing drivers in my system?"

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"Are there any important points I need to be aware of when changing drivers in my system?"

contents of this section

- standard drivers
- deciding to change drivers
- possible impact on other parts of the system

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standard drivers

Major server manufacturers usually qualify their systems with specific versions of drivers, which are then included on any installation CDs they provide with their systems. For example, the HP NetServer Navigator CD included with each HP NetServer contains HBA and Network Card drivers for the various operating systems supported. These are then included in any OS installation performed by the automatic OS Installation Assistant provided on this CD.

deciding to change drivers

Before altering drivers, you should be aware that doing so can effectively introduce untested drivers into your systems. As such, it is wise to only alter drivers if problems are actually being experienced. However, drivers - especially HBA drivers - are constantly being refined. Using a later version of a driver should not introduce any new reliability problems, and can often improve any existing reliability problems you may have on your systems.

possible impact on other parts of the system

If you are experiencing SCSI errors when using your backup software, you need to consider the possible impact on the other parts of the system before you decide to change the HBA drivers.

For example, upgrading the driver for the SCSI controller connected to the tape drive will not alter the driver controlling the disk subsystem in the following cases:

1. Where the system hard disks are controlled by a Symbios SCSI controller and driver, and where the tape drive is connected to an Adaptec 2940UW.

2. Where the system hard disks are controlled by a HP NetRAID controller and driver, and where the tape drive is connected to a Symbios controller.

Upgrading the driver for the SCSI controller connected to the tape drive will also alter the driver controlling the disk subsystem, in the following cases:

1. Where the system hard disks are controlled by a Symbios SCSI controller and driver, and where the tape drive is connected to a Symbios SCSI controller.

2. Where the system hard disks are controlled by an Adaptec 7880 controller and driver, and where the tape drive is connected to an Adaptec 2940UW.

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next question

Go to the next question "Why does my autoloader not work correctly with ISV Backup Software, or the Windows NT in-built backup applet?"

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"Why does my autoloader not work correctly with ISV Backup Software, or the Windows NT in-built backup applet?"

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Note: This question only relates to DDS format tape drives. Autoloaders are not available for DLT or Ultrium formats.

windows NT tape drivers

Autoloaders are not supported by the Windows NT supplied tape drivers, as discussed in the answer to the question "How do I know what drivers I am using at the moment, and what drivers do I need for running tape backups?". This is because Autoloaders are not supported by the Microsoft supplied backup application, NTBackup, under neither Windows NT 3.51 nor Windows NT 4.0.

ISV backup software

In order for ISV Backup Applications to work with Autoloaders, firstly the ISV tape driver that supports the Autoloader must be loaded (see the ISV supplied documentation for full details). ISV Backup Applications will generally either automatically load the required tape drivers (for example ArcServe / ArcServeIT), or prompt you on how to do so (for example BackupExec).

If tape drivers are not automatically loaded, or you are not prompted, then if the ISV has supplied drivers, they are generally kept in a \i386 or \drivers directory on the ISV CD.

Secondly, for many ISV Backup Applications, Autoloader support is an option that must be purchased (in the form of an "Autoloader module") on top of the base application.

how to get further information

In order to check that the Backup Application supports the tape drive, check with the ISV, or check "http://www.hp.com/go/connect".

next question

Go to the next question "Why do I get SCSI errors when using my Tape Drive?"

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"Why do I get SCSI errors when using my tape drive?"

contents of this section

- causes of SCSI errors
- upgrading to the latest HBA drivers
- how to obtain upgrades

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causes of SCSI errors

There can be many causes of SCSI errors:

1. Cabling can be too long, too many devices connected, no bus termination, non-shielded internal cables being used for external applications, badly seated connectors, tape drive has same SCSI ID as another device etc.
2. SCSI HBA.
3. Tape Drive.
4. HBA Driver.
5. Tape Device Driver.
6. Backup Application.

Of all of the above, cabling and drivers are by far the most likely causes of SCSI errors.

upgrading to the latest HBA drivers

If you are experiencing SCSI errors, then having checked your cabling you should consider upgrading your HBA drivers to use the latest drivers.

Drivers are constantly being refined by manufacturers, and HP's experience in compatibility testing on HP Surestore tape drives has shown that using the latest versions of drivers (especially HBA drivers) can solve many of the SCSI problems that occur.

However, check out the answer to the question "Are there any important points I need to be aware of when changing drivers in my system?" before altering drivers in your system.

how to obtain upgrades

In order to check that the Backup Application supports the tape drive, check with the ISV, or check "http://www.hp.com/go/connect".

next question

Go to the next question "Which HP Surestore tape drives are certified by Microsoft, ISV's and IHV's for use on Windows NT?"

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"Which HP Surestore tape drives are certified by Microsoft, ISV's and IHV's for use on Windows NT?"

contents of this section

- Windows NT Certification
- ISV Backup Software
- Supported Devices Lists

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windows NT certification

Certification of Tape Devices with Windows NT means that the Tape Device has been tested using Microsoft's certification test suite, and is supported by Microsoft for use with NTBackup.

Although a tape drive may not currently be marked as certified by Microsoft with its Tape Device drivers and NTBackup, it does not mean that the tape device cannot be used with NTBackup or ISV Software. The Microsoft tape drivers will support the devices specified in the answer to the question "How do I know what drivers I am using at the moment, and what drivers do I need for running tape backups?". Support for DAT24 on Windows NT 3.51 can be achieved using the driver supplied on the HP Surestore CD-ROM. This driver is not certified, but has been tested in-house by HP.

During Hewlett-Packard's in-house compatibility testing no problems were found using HP SuresStore DAT and DLT tape drives with NTBackup. Hewlett-Packard is actively working to ensure that all HP SureStore DAT and DLT tape drives are certified by Microsoft.

Note - Ultrium high performance tape drives: As a general rule, native backup applications (such as NTBackup and tar) do not provide the required data streaming rate to get the full performance of your Ultrium drive. We recommend using a backup application, which provides better memory management as well as other useful features, such as TapeAlert. HP, Computer Associates, Veritas, Legato and Yosemite all provide suitable products that have been tested with your Ultrium drives. For the latest list of backup packages that support your Ultrium drives, please contact your tape drive or library manufacturer.

The current Microsoft Windows NT Tape Device driver certification status is given in the table below.

Tape Drive	Driver	Windows NT3.51 SP5	Windows NT4.0 SP4
DAT8	HPDAT.sys	Certified	Certified
DAT24	HPDAT.sys	Certified	Certified
DAT40	HPDAT.sys	Certified	Certified
DAT24x6	HPDAT.SYS	Certified	Certified
DAT40x6			
DLT80	dlttape.sys	Certified	Certified
DLTVS 80			
Ultrium 230		Not applicable	Not applicable
Ultrium 230		Not applicable	Not applicable

Notes:

1. All drivers are available on the relevant HP Surestore CD-ROM.

ISV backup software

ISV Backup Software does not tend to use the Microsoft Tape Device drivers, but instead use their own tape drivers. Hewlett-Packard has an ongoing Compatibility testing program to ensure that HP Surestore Tape Drives work with a wide range of HP and 3rd party servers, Operating Systems, SCSI HBAs, and ISV Backup Software.

For a full list of compatible devices and software, consult http://www.hp.com/go/connect.

supported devices lists

IHV's (SCSI HBA vendors) and ISV's (backup software vendors) maintain their own supported devices lists. Hewlett-Packard is actively working with major IHV's and ISV's to ensure that HP Surestore Tape Drives are included in their compatibility testing and are on their supported devices lists.

next question

Go to the next question "How do I use the built-in Tape Backup applet provided by Microsoft?"

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tape backup applets

The built-in Tape Backup applet provided by Microsoft is called NTBackup. This runs on the local server, and provides basic backup functionality to backup data on drives (or Mapped Network drives) on the server.

The Windows NT 3.51 and NT 4.0 versions do not include Autoloader support, or scheduling (although this can be done, with difficulty, using the Windows NT "at" scheduler service - see the Windows NT Resource Kit for details).

Note - Ultrium high performance tape drives: As a general rule, native backup applications (such as NTBackup and tar) do not provide the required data streaming rate to get the full performance of your Ultrium drive. We recommend using a backup application, which provides better memory management as well as other useful features, such as TapeAlert. HP, Computer Associates, Veritas, Legato and Yosemite all provide suitable products that have been tested with your Ultrium drives. For the latest list of backup packages that support your Ultrium drives, please contact your tape drive or library manufacturer.

NTBackup

For full details of NTBackup, consult the NTBackup Quick Reference Guide.

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NTBackup quick reference guide

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introduction

NTBackup is a built-in backup application provided by Microsoft with Windows NT 3.51 and Windows NT 4.0.

NTBackup supports the backing up of data on local drives and mapped network drives, and allows full / incremental backup strategies & monitoring of the current job. It does not support Autoloaders.

This document gives a brief description of how to use NTBackup.

using NTBackup

It is assumed that you have a general knowledge of how to set up and administer a Windows NT 3.51 or a Windows NT 4.0 system.

For more details on how to use all the features of NTBackup, the user should consult their Windows NT manual.

Help in NTBackup can also be obtained by choosing the help option on the menu bar.

running NTBackup

In order to run NTBackup, the system must be set up as follows:

Loading the SCSI HBA and Tape Device drivers:

The SCSI HBA should already be installed, with the tape drive attached. If this is not the case, ensure the SCSI HBA and Tape Driver are loaded, as described in the answer to question "How do I know what drivers I am using at the moment, and what drivers do I need for running tape backups?"

Selecting NTBackup:

NTBackup can be found in the "Administrative Tools" folder in "Main" on Windows NT 3.51, and under "Administrative Tools" on the "Programs" menu of the "Start" menu in Windows NT 4.0.

performing a backup

To perform a backup, work through the following steps:

1. If the Drives window is not already open, click on the "Drives" button at the bottom of the dialog box.
2. Select the files to back up.
3. Click on the "Backup" button to start the backup. The "Backup Information" window will appear.
4. Click on the "Verify After Backup" checkbox so that a tick appears in it. This option performs a verification pass after the backup to check that the files on the tape match those that were backed up.
5. Click on the "OK" button to start the backup. When the backup is complete, the "Verify" (Windows NT3.51) or "Backup" (Windows NT 4.0) Status window will appear.
6. A message in the Summary box will tell you if the backup was successful. If it was not, look first in this FAQ document. If that does not help, refer to your Windows NT documentation, your host adapter documentation, and your computer manuals.

performing a restore

Performing a restore is much the same as a performing a backup, using the restore options in NTBackup rather than the backup options. You can select which files to restore, and where you wish to restore them (this does not necessarily have to be the same location from where they were backed up).

known issues

There are no known issues, other than the fact that the performance of NTBackup with slower disk drives can be less than 2MB/s, and hence is unsuitable if the full speed potential of a high performance tape drive is required.

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